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MEMOIRS

OF THE

ROYAL ASTRONOMICAL SOCIETY.

VOL. LV.—1904.

WITH TWO APPENDICES

LONDON:
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CONTENTS.

PAGE

Observations of Variable Stars made at the Rousdon Observatory, Lyme Regis, under the direction of the late Sir C. E. PEEK, Bart., M.A. *Edited by* H. H. TURNER, D.Sc., F.R.S. . . [5]

APPENDICES.

I. *Radiation in the Solar System: its effect on temperature and its pressure on small bodies.* By J. H. POYNTING, Sc.D., F.R.S. [1]

II. *An enquiry into the nature of the relationship existing between Sun-spot frequency and Terrestrial Magnetism.* By C. CHREE, Sc.D., LL.D., F.R.S. . . . . [29]

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OBSERVATIONS

OF

VARIABLE STARS

MADE AT THE

ROUSDON OBSERVATORY, LYME REGIS

UNDER THE DIRECTION OF THE LATE

SIR C. E. PEEK, BART., M.A.

EDITED BY

H. H. TURNER, D.Sc., F.R.S.

Savilian Professor of Astronomy in the University of Oxford

LONDON

ROYAL ASTRONOMICAL SOCIETY

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CONTENTS.

INTRODUCTION.

PARAGRAPH		PAGE
1–4.	Introductory Note	i
5–30.	Sir C. E. PEEK's Introduction, written in 1896	ii
5.	Date of observations	ii
6.	Stars selected	ii
7, 8.	Number of observations, &c.	ii
9–15.	Telescopes, eyepieces, &c.	ii
16–23.	Method of observation	iii
17–19.	Charts for observing	iii
20.	Comparison stars	iv
21.	Precautions against bias	v
22.	Modification of ARGELANDER'S method	v
23.	Harvard diagrams and data issued in 1890	v
24.	Comparison of Rousdon with Harvard	vi
25, 26.	Physical appearance of variables	vi
27.	Colour of variable	vi
28.	Colour of comparison stars	vi
29.	Moonlight	vii
30.	Possible variables among comparison stars	vii
31.	Note by the Editor	vii
	DISCUSSION OF THE OBSERVATIONS	viii
32–34.	List of stars observed	viii
35–37.	Method of observation. (Five comparisons. Large intervals) ...	ix
38.	Record. Minus means fainter than	x
39–61.	Scale value for Rousdon comparisons	x

PARAGRAPH		PAGE
43.	Main features of the arbitrary scale	xi
46–50.	Discussion of an anomaly	xiii
51–54.	Harvard magnitudes do not suit Rousdon	xiv
54.	Error of record decreases from bright to faint stars	xv
55–59.	Error of record changed at 1893·0 and 1898·0	xv
59–61.	Rule for applying error of record, or scale value	xvi
62–77.	Possible error due to position-angle	xvii
63–65.	Hour-angle of observations	xviii
66, 67.	Rotation of field with hour-angle	xix
68–71.	Example from *S Cygni*	xix
72.	„ „ *T Ursæ Majoris*	xx
73–76.	„ „ *T Draconis*	xxi
77.	Search for this systematic error abandoned	xxi
78–107.	Magnitudes of comparison stars	xxii
78.	Opinion of Professor E. C. PICKERING	xxii
80–84.	Explanation of preliminary deduction of magnitudes of comparison stars from the records (Table XI. on pp. xxiv–xxxv)	xxii
85–93.	Formation of equations and solution of them (Table XII. on pp. xxxviii–xlviii)	xxxv
94, 95.	Comparison of the two independent sets of Rousdon Corrections to Harvard	xlix
97–99.	Systematic difference between the two independent sets; and Corrections to "numbered" series for *S Cassiopeiæ*, *R Ursæ Majoris*, *T Ursæ Majoris*, *S Ursæ Majoris*, *R Camelopardi*, *R Draconis*, *R Cassiopeiæ*	lii
100–107.	Individual corrections real and not accidental	liii
105.	Possible causes of systematic difference: Colour: Position in field of view: near equality of two stars	liv
106.	Advantages of the Rousdon observations and methods	lv
108, 109.	Identification of the comparison stars charts: standard coordinates	lvi
110–160.	Results of the observations and comparison with CHANDLER'S formulæ	lvii
111–117.	Formation of preliminary light-curve for *T Cassiopeiæ*	lviii
118.	Formation of mean residuals	lx
119.	Suggested tabular form for exhibiting results	lx

PARAGRAPH		PAGE
120–126.	Comparison of residuals with Harvard. Large deviations in one series are not confirmed by the other; and hence it is suggested that the light curve may be more regular than the observations indicate	lx
127.	No annual or seasonal effect for *T Cassiopeiæ*	lxiv
128–130.	Method of correcting assumed period of light curve. Example from *S Boötis*	lxv
131.	Period for *T Cassiopeiæ*, and comparison with CHANDLER ...	lxviii
133.	„ „ *S Cassiopeiæ*	lxix
134.	Double period for *S Persei*	lxxi
135.	Long period for *S Persei*	lxxi
136.	Period for *R Aurigæ*	lxxiii
137.	„ „ *U Orionis*	lxxiii
138.	„ „ *R Lyncis*	lxxiv
139.	„ „ *R Ursæ Majoris*	lxxv
140.	Change of period for *R Ursæ Majoris*	lxxvi
141–144.	Period, and change of period, for *T Ursæ Majoris*	lxxvii
145.	„ „ *S Ursæ Majoris*	lxxx
146–148.	„ „ *S Boötis*	lxxxi
149.	Period for *R Camelopardi*	lxxxiii
150.	„ „ *S Coronæ*	lxxxiii
151.	„ „ *R Ursæ Minoris*	lxxxiv
152.	„ „ *R Draconis*	lxxxv
153.	„ „ *S Herculis*	lxxxvi
154.	„ „ *T Draconis*	lxxxvii
155.	„ „ *R Cygni*	lxxxvii
156.	„ „ *χ Cygni*	lxxxviii
157.	„ „ *S Cygni*	lxxxix
158.	„ „ *T Cephei*	xc
159.	„ „ *S Cephei*	xci
160.	„ „ *R Cassiopeiæ*	xcii
161–165.	Summary of comparison with CHANDLER's formulæ	xciii
163.	Probable error of a determination of period	xcv
165.	Excellence of CHANDLER's formulæ	xcv

PARAGRAPH		PAGE
166.	Nature of CHANDLER's periodic terms	xcv
167.	Not due to orbital light-equation	xcvi
168–170.	Nature of possible "interference" effect	xcvii
171–173.	Harmonic analysis of light curves	xcvii
174–176.	Relations among the harmonic coefficients	xcix
177–182.	Attempt to separate components of the light curve for *S Ursæ Majoris*	ci
183.	Data for *R Ursæ Majoris*, *T Ursæ Majoris*, *S Boötis*	ciii
184–187.	Comparison with Harvard	civ
185.	Curious case of *T Cephei*: Rousdon minus Harvard differs before and after maximum	civ
186.	Division of *very Red* from *Reddish* stars	cv
187.	Conspicuous difference in Rousdon minus Harvard for the two classes	cv
188.	Individual Tables of Rousdon minus Harvard	cv
Postscript.	Comparison with CHANDLER's Revised Elements	cxiii
	Explanation of the Printed Observations	cxvi

OBSERVATIONS OF VARIABLE STARS.

	PAGE
T CASSIOPELÆ	1
S CASSIOPELÆ	8
S PERSEI	14
R AURIGÆ	19
U ORIONIS	25
R LYNCIS	31
R URSÆ MAJORIS	36
T URSÆ MAJORIS	43
S URSÆ MAJORIS	51
S BOÖTIS	60
R CAMELOPARDI	66
S CORONÆ	73
R URSÆ MINORIS	79
R DRACONIS	83
S HERCULIS	91
T DRACONIS	96
R CYGNI	99
χ CYGNI	104
S CYGNI	109
T CEPHEI	112
S CEPHEI	117
R CASSIOPEIÆ	124

Errata in Vol. LV., Memoirs, R.A.S.

Page xxxiii. Correct column for x (3rd column) as follows :—

Line	5,	*for*	+3·7	*read*	+2·7
,,	6	,,	+4·5	,,	+3·5
,,	7	,,	+5·2	,,	+4·2
,,	12	,,	−6·8	,,	−5·8
,,	14	,,	−5·8	,,	−4·8

Page 30. Correct column for "Deduced Magnitude" (last but three) as follows :—

1898 Nov.	18,	*for*	11·5	*read*	11·7
Dec.	7	,,	10·6	,,	11·2
1899 Apr.	8	,,	6 9	,,	6·7
May	3	,,	6·0	,,	6·4
Oct.	12	,,	7·3	,,	10·7
Oct.	28	,,	6·7	,,	11·7
Nov.	6	,,	6·6	,,	11·4
Nov.	26	,,	6·2	,,	11·8
Dec.	6	,,	6·3	,,	11·7
Dec.	25	,,	7·5	,,	10·5
1900 Feb.	17	,,	9·5	,,	9·9
Dec.	28	,,	11·3	,,	10·8

Page 30. Correct column for "Scale Correction" (last but two) as follows :—
On 1899 Oct. 28, Nov. 6, Nov. 26, Dec. 6, and Dec. 25, *for* −·3 *read* −·2.

Page 38. Julian date for 1892 Oct. 25 : *for* 2337 *read* 2377.

Page 86, last line. In some copies the last figure has dropped. It should be −·3.

Page 93. 1896 April 8. In column "Deduced Magnitude," *for* 11·1 *read* 8·5.

Position of Observatory.

It may be mentioned that the position of the Rousdon Observatory is given in the *Nautical Almanac* for 1904 as

$0^h\ 11^m\ 58^s{\cdot}94$ W. 50° 42′ 38″ N. Altitude 516 feet,

the authority being the Ordnance Survey.

Observations of Variable Stars

Made under the direction of Sir CUTHBERT E. PEEK, Bart., M.A.

Introductory Note. By H. H. TURNER, D.Sc., F.R.S., Savilian Professor of Astronomy in the University of Oxford.

1. The observations of variable stars contained in this volume were made under the direction of the late Sir CUTHBERT E. PEEK, Bart., M.A., F.R.A.S., at his observatory at Rousdon, near Lyme Regis, in the years 1885–1900. The actual observations were made by Mr. C. GROVER, but Sir CUTHBERT PEEK checked them frequently, and personally superintended the whole work.

2. In the early part of 1900 Sir C. PEEK wrote asking whether I would help him with the editing and discussion of the results. He said that this request was suggested by the appearance of Volume LII. of these *Memoirs*, in which I had edited the observations of the late Mr. GEORGE KNOTT. I hesitated to undertake this new responsibility for two reasons: first, the editing of Volume LII. arose (as may be seen on reference to the third sentence on p. vii) out of my work as Secretary to the Royal Astronomical Society; an office which I no longer held in 1900; secondly, I was fully conscious of the great disadvantage for such work of not having observed variable stars myself. But while the correspondence was proceeding Sir C. PEEK became seriously and hopelessly ill, and this increased his anxiety that something definite should be settled about the observations, for the work of the observatory held a very prominent place in his thoughts. The reasons above mentioned were thus thrown into the background, and I undertook to do the best I could with the observations. I may add that before finally doing so I wrote to Professor E. C. PICKERING, of Harvard, who had just published a volume * of detailed observations relating to stars which are in great part the same as those observed at Rousdon (indeed, the Rousdon programme was adopted from Harvard), sending him specimens of the observations and some comments suggested by the brief inspection already made. He replied that "the observations were even more valuable than he thought," and urged the publication of the detailed

* *Harvard Annals*, vol. xxxvii. Part I.

comparisons. This opinion from such an authority had naturally great weight in determining the completeness of the discussion and the publication of the results in this form.

3. It should be mentioned that Sir C. E. PEEK had made provision for the printing of the observations, as well as for the payment of the computers who worked under my direction.

4. Before his fatal illness Sir C. PEEK had written the Introduction, which follows, describing the general character of the observations.

Rousdon Observatory, Lyme Regis.

Introduction to Variable Star Observations.*

5. Variable star observations were commenced toward the end of 1885, and have been regularly continued to the present time.

6. The stars selected for examination have been those classed as "long-period variables," and no star has been placed on the working list with a reputed period of less than 200 days.

7. The work has thus been in progress for ten years,* during which time about thirty long-period variables have been under observation and 4,133 determinations of magnitude have been recorded. One hundred and sixty-two maxima and 136 minima have been observed. The paper here presented * gives the results of twenty of the most favourably placed and best observed variables, with the dates of 147 maxima and 124 minima.

8. Observations have been directed, not only to the determination of the dates of the maxima and minima of each star, but to the investigation, as far as possible, of the entire light curve. As this requires the observations to be as nearly as possible continuous, no stars south of the equator have been included.

9. The instrument used is an achromatic telescope by MERZ; aperture of object-glass 6·4 inches, focal length 74 inches, carried by a very firm and simple equatorial mounting by COOKE. The magnifying powers most constantly used are 25, 34, 80, and 132; on some few occasions powers of 206 and 310 have been found useful.

10. The lowest power, 25, was obtained from STEINHEIL in 1886. It is an unusually large eyepiece, measuring 4 inches in length. The field lens is $2\frac{1}{4}$ inches, and the eye lens nearly 1 inch in diameter, with an eye-hole of $\frac{7}{8}$ inch. The diaphragm is square, and of such size that when directed to the equator the field embraces about one square degree; across this platinum wires are stretched, so that the field of view is divided into sixteen squares. The eyepiece thus becomes a kind of rough reticulated micrometer with which all the charts of stars in the vicinity of the variables have been drawn.

* [Written in 1896 by Sir C. E. PEEK.—ED.]

11. A low-power eyepiece was obtained from Sir HOWARD GRUBB which was found to magnify thirty-four diameters. This gives a very brilliant field of view, and stars down to the 12th magnitude are well seen; the diaphragm is square, and not crossed by any wires. This eyepiece is most frequently used, and in the succeeding pages whenever the power is not specified it is to be always understood that the observation was made with power 34.

12. One of STEINHEIL'S solid achromatic eyepieces, giving a power of 132, is extremely useful on very faint stars. In this construction the rays of light from the object-glass have to pass through about half an inch of solid glass; the image, however, is remarkably clear and well defined. In comparison with an ordinary two-lens eyepiece of about the same power the solid has decidedly the advantage, and shows minute stars with greater distinctness.

13. Nearly all the variable star observations are made with these four eyepieces. The power of 25 is used for charting, and 34, 80, and 132 for general observations.

14. The usual screw adapters have been discarded, and the eyepieces have been fitted with sliding tubes, so that they can be instantly changed without any delay in screwing. In the case of many hundreds of observations, involving frequent changes of power, to be performed in the dim light which alone can be allowed in the observing room, the saving of time by this simple device is considerable.

15. Many variable stars can be well seen about their time of maxima with a good binocular or field glass, and I have so seen several of those in this working list. Such observations can be made with but little trouble, and in the absence of better means may possess some value in determination of the time of maxima brilliancy. Their utility, however, in connection with observations which are directed to obtaining the complete light curve of most of the variable stars is very small, owing both to the small portion of the entire period during which a star can be thus viewed, and to the great difference in the appearance of stellar images in a field-glass and in a good telescope. But, above all, the difficulty of making a series of accordant magnitude estimations with two such widely dissimilar instruments as a field glass magnifying perhaps eight diameters and a telescope magnifying from twenty-five to 132 has been, in my experience, fatal to the useful employment of the field glass in continuous variable star observations.

16. The method of procedure on commencing observations of a variable star is as follows: The right ascension and declination having been found in the latest available catalogue, the equatorial is carefully set to this position, and the 25 power being used, the eyepiece is revolved in its tube till some conspicuous star in the field accurately traverses one of the wires, when the clock is stopped and the telescope is at rest. The four sides of the square diaphragm then coincide with north and south and preceding and following, and the wires are parallel to circles of right ascension and declination.

17. Printed forms are used in this work, with a blank chart projection four inches square crossed by lines corresponding to the wires in the eyepiece. On this the stars

are carefully filled in exactly as seen in the telescope. The equatorial clock driving accurately during this operation, some star is, as a rule, kept bisected on a wire while the map is being drawn. A number is then affixed to each star, and a table of these numbers with the estimated magnitudes entered in the observing book. A moonlight night when there is sufficient light just to clearly see the wires is sometimes utilised for this purpose, but more often the wires have been rendered visible by a COOKE'S prismatic illuminating apparatus; and this is to be preferred, as by the convenient arrangements provided the intensity of the light can be modified to the greatest nicety.

18. In a few cases a reference to ARGELANDER'S maps has enabled the variable to be at once identified, but in most instances these charts have been independently drawn without reference to any previous maps, and the variable has been identified on continued observation by its changes of brilliancy as compared with the neighbouring stars. No attempt has been made to lay down every star visible,* particularly in the more crowded portions of the heavens, preference being given to those stars whose position and magnitude are most useful as comparison stars; the charts are therefore only intended as rough guides to finding the variables.

19. It frequently happens that when the variable is brought to the centre of the field of view some conspicuous stars, very useful as ready guides to the variable, or of a magnitude suitable for comparison stars, are at some distance beyond the limits of the chart. I have not hesitated to select the most convenient field for the work, and consequently the variable is not always in the centre of the working chart.† By this device many observations have been obtained which would otherwise have been impossible, especially in those instances when a variable is followed toward the sunset horizon, and necessarily can only be observed in bright twilight, the only guide being some conspicuous stars thus included.

20. The method of observation for comparison stars has been to estimate their brightness to the nearest $\frac{1}{10}$th of a magnitude. If there are a number of stars within the telescopic field whose brightness differs but little, these small fractions can be well seen. Thus given six stars ranging from 8·4 to 9·0 magnitude by equal amounts, the practised observer would without the least difficulty discriminate between each star; but on the other hand supposing six stars ranging from the 6th to the 11th magnitude by very unequal amounts, then the detection of so small an amount as $\frac{1}{10}$th of a magnitude becomes almost impossible. A single estimation of the magnitude of any telescopic star is of little value, as I have found from the discussion of a large number of observations that differences of 0·5 magnitude plus or minus are common. The practice has therefore been to take sets of at least five estimations of the magnitude of each star at considerable intervals, in some cases extending over several months, and the mean of all these is that finally adopted. In some cases the accuracy of these values has been again tested by fresh sets of estimations after an interval of several

* [This is to be remembered in connection with the remarks in §§ 98 and 108.—ED.]

† [This is to be remembered in connection with the remarks in § 62 &c.—ED.]

years. Too much care cannot be bestowed on this work, as it is obvious that the ultimate value of any variable star observations must depend on the exactness with which the magnitudes of the comparison stars are determined. It is to be regretted that owing to the faintness of most of these objects Professor PRITCHARD'S photometric method is not available.

21. It is of the first importance that each set of observations should be perfectly independent, and the observer's mind quite free from any bias from previous observations. To ensure this the sheets of estimations were never referred to until the sets were complete, when the mean magnitude was worked up. The observatory work in the considerable intervals which usually elapsed was so multifarious that this desirable result was thoroughly attained.

22. The observations of the variable stars have been conducted on ARGELANDER'S method of estimating to the nearest tenth of a magnitude the difference in brilliancy between the variable and several of the comparison stars, preference being always given to those stars most nearly approaching the variable itself. The usual practice is to compare the variable with at least five stars, but if a larger number are available the series of comparisons is often extended. It is always advisable to compare with stars both brighter and fainter than the variable; by this means any tendency in the eye to accommodate itself, and thus cause a sort of personal equation, is counteracted, and the results, even when individually somewhat discordant, so balance each other that a reliable mean magnitude is obtained. Some of the variables rise at maximum considerably brighter than any comparison star within the same telescopic field, while others fall at minimum below the faintest visible; thus it follows that in the first case the comparison can only be with fainter, and in the second case with brighter stars than the variable itself. A discussion of a large number of observations shows that when the comparison is made entirely with stars fainter than the variable the mean result makes it too bright, while when stars brighter than the variable are employed the mean magnitude comes out too low.* Under these adverse conditions special care has been taken to obtain the most accurate results possible. In actual observation the comparison stars are simply known by their numbers or letters. The tables of mean magnitudes are never taken to the observatory, and the resulting magnitude of the variable is not known till the observations are reduced and entered up on the following day.

23. Observations by these methods were continued on all available occasions till toward the end of 1890, when diagrams of circumpolar variables were received from the Harvard Observatory, accompanied by lists of selected comparison stars the magnitude of which had been photometrically determined. These stars, designated by the letters of the alphabet, were at once† adopted, and since 1890 December 31 the Harvard magnitudes have been regularly employed.

* [See cases (A) and (E) in § 48.—ED.]

† [I do not find that the alteration was made at once.—ED.]

24. It was satisfactory to find on comparing the Rousdon estimated magnitudes that they differed from the Harvard observations less than might have been expected, and in many instances were identical, the general tendency being to estimate the stars as too bright. As the result of an extensive comparison between the Harvard and Rousdon values, it has been determined that the Rousdon observations assigned a mean magnitude of 0·5 magnitude in excess. This correction has therefore been applied to all results previous to 1890 December 31.*

25. Great attention has been devoted to the visual physical appearances presented by these variables. It was soon found that they differ in a remarkable degree from ordinary stars. Most of them are of a deep red or ruddy colour, and many are more or less nebulous. They may be divided into four classes, viz. stars having—

(*a*) A remarkably well-defined almost planetary disc.
(*b*) Well-defined stars surrounded by a more or less dense, ruddy atmosphere.
(*c*) Large woolly stars, with ill-defined image, resembling a small but bright planetary nebula.
(*d*) Stars which at minimum show, in place of the variable, a slight bluish nebulosity.

26. At every observation, besides the usual magnitude determinations, notes are added describing the appearance of the variable, and whenever anything unusual is noticed several different eyepieces are employed.†

27. Colour has a great influence on magnitude observations, and in particular the deep red or ruddy hue which is a well-known characteristic of variable stars. Frequent instances have occurred during the progress of the observations of a variable and one or more of its comparison stars being sensibly equal so far as the image was concerned, but owing to the decided red and sometimes deep coppery hue the former appeared considerably the fainter. The usual practice has been, after entering the usual comparisons of any variable, also to insert in the original notebook an estimation of the magnitude of the variable itself as seen independently of any other star, and a comparison of these single observations with the mean results of the comparison stars shows the effect of colour very clearly. Taking indiscriminately twenty-five observations, I find that in three instances the estimated and mean magnitude are the same; in eight observations the variable is estimated *brighter* than the mean, while in no fewer than fourteen observations the variable is estimated *less* than the mean. This practical difficulty can be well illustrated by the experiment of viewing an electric spark through variously coloured glasses.

28. There is also considerable diversity of appearance among the comparison

* [This general correction is not confirmed by my examination. But it only applies to the magnitudes of the variable previously published in the "Variable Star Notes" issued from Rousdon.—ED.]

† [These notes have been already published in "Variable Star Notes," and I did not consider it necessary to reproduce them here.—ED.]

stars included in these charts. Many are noted of moderate magnitude, but whose light is peculiarly white and piercing; and on the contrary other stars of equal or even greater magnitude, but more or less tinged with red, orange, yellow, or grey, are far less conspicuous. These coloured stars are more difficult to observe in moonlight or twilight, and are much more readily obscured by a slight cloud or fog than their whiter neighbours.

29. Moonlight is no great obstacle to observation when the stars looked for are not below the 10th magnitude, and experience has shown that, both as regards magnitude and colour, observations taken in bright moonlight are as accordant and trustworthy as those taken on a dark sky. Observations about the time of maximum of most of these stars when they are from the 5th to the 8th magnitude are not interrupted by the Moon, but in the case of those which may be near minimum, and therefore very minute, some judgment must be exercised, and observations can be often obtained during the first half of the lunation after the Moon has set, and during the latter half before moonrise, by which such interruptions may be much diminished.

30. On several occasions when observing well-known variables, minute but well-defined stars have been noticed in positions which had been under careful observation for many months without any star being seen, and these minute points have again often disappeared. Want of time has prevented due attention being given to these uncatalogued objects, but the inference is that variable stars are much more numerous than is commonly supposed, and, reasoning from analogy, we may with great reason infer that as many well-known variables range from about the 6th to the 13th magnitude, so there may be many which range from about the 13th to the 20th and still greater degrees of minuteness. This latter class of course could only just come within the range of such a telescope as that used in these observations for a brief period at about their maxima, and probably some of these casually seen faint stars are due to this cause. Moreover as the number of the fixed stars enormously increases among the smaller magnitudes, so this class of minute variable may be correspondingly numerous. Here, then, is a practically unexplored field for the largest telescopes. The observations have been made by my assistant, Mr. C. GROVER, checked on all available occasions by myself.

C. E. PEEK.

31. *Note added by the Editor on* 1902 *July* 8:—On reading through this Introduction, after having thoroughly discussed the observations, and so got their peculiarities clearly in my mind, I am struck with the completeness with which these peculiarities have been noticed. The systematic error in scale value (see § 39 &c.) is represented in the remark in § 22. The effect of colour of the variable on the comparisons and smaller variations of colour on the magnitudes of the comparison stars (see § 105) are indicated in §§ 27, 28. Facts such as the position of the variable in the field and the completeness of the charts, which may turn out important afterwards, are carefully noted, and so on. The subsequent discussion adds numerical

exactness to such remarks; but Sir C. PEEK had foreseen in a general way nearly everything of importance, and it is the more deeply to be regretted that he did not live to complete his work.

DISCUSSION OF THE OBSERVATIONS.

Stars Observed.

32. As stated in the above introduction by Sir C. PEEK, the stars selected for examination are all long-period variables. Professor E. C. PICKERING, of Harvard, has specially invited co-operation in observation of such stars, especially those which are circumpolar, and has recently published (in vol. xxxvii., Part I., of the *Harvard Annals*) ten years' observations of stars of this class. This work has been constantly referred to in the discussion of the present observations.

33. Observations are still in progress at Rousdon, but the date 1901·0 has been selected as a convenient epoch for the termination of those here printed and discussed.

34. The following is a complete list of the stars observed at Rousdon. The letter H in the column indicates that the star occurs also in the *Harvard Annals*, vol. xxxvii. Part I., "Observations of Circumpolar Variable Stars during the years 1889–1899," and the letter H_2 that the star occurs in Part II. of the same volume, which contains observations of fifty-eight other variables. The period and places are from Chandler's Third Catalogue of Variable Stars (*Astron. Journal*, No. 379).

TABLE I.

	Place 1900·0.		Place 1855·0.		Obs. begun at Rousdon.	Harvard.	Period.
	R.A.	Dec.	R.A.	Dec.			
	h m s	° ′	h m s	° ′			
T Cassiopeiæ ...	0 17 49	+55 14·3	0 15 25	+54 59·3	1889	H	445
S Cassiopeiæ ...	1 12 18	+72 5·1	1 9 4	+71 50·8	1888	H	610·5
S Persei	2 15 41	+58 7·8	2 12 29	+57 55·2	1891	H	...
R Aurigæ ...	5 9 13	+53 28·5	5 5 36	+53 25·0	1889	H	460·2
U Orionis ...	5 49 53	+20 9·4	5 47 13	+20 8·7	1887	H_2	375
R Lyncis ...	6 53 3	+55 28·1	6 49 20	+55 31·6	1892	H	380·0
R Ursæ Majoris	10 37 34	+69 18·0	10 34 19	+69 32·1	1888	H	302·1
T Ursæ Majoris	12 31 50	+60 2·3	12 29 47	+60 17·2	1887	H	257·2
S Ursæ Majoris	12 39 34	+61 38·4	12 37 35	+61 53·3	1887	H	226·1
S Boötis ...	14 19 32	+54 15·9	14 18 1	+54 28·3	1889	H	268*
R Camelopardi ...	14 25 6	+84 17·1	14 28 54	+84 29·2	1889	H	269·5
S Coronæ ...	15 17 19	+31 43·6	15 15 29	+31 53·5	1887	H_2	360·8
R Ursæ Minoris	16 31 18	+72 28·7	16 31 57	+72 34·4	1891	H	Irreg.
R Draconis ...	16 32 23	+66 57·8	16 32 17	+67 3·5	1889	H	245·6
S Herculis ...	16 47 21	+15 6·6	16 45 18	+15 11·4	1887	H_2	308·1

* At epoch given by Chandler; but there is a secular variation.

TABLE I.—*continued.*

	Place 1900·0.		Place 1855·0.		Obs. begun at Rousdon.	Harvard.	Period.
	R.A	Dec.	R.A.	Dec.			
	h m s	° ′	h m s	° ′			
T Draconis ...	17 54 51	+58 13·6	17 54 11	+58 14·0	1895	...	569
R Cygni ...	19 34 8	+49 58·5	19 32 56	+49 52·5	1887	H_2	425·7
χ Cygni ...	19 46 44	+32 39·7	19 45 0	+32 33·0	1887	H_2	406*
S Cygni ...	20 3 24	+57 41·9	20 2 28	+57 34·2	1892	H	322·8
T Cephei ...	21 8 13	+68 5·0	21 7 33	+67 54·4	1891	H	387
S Cephei ...	21 36 28	+78 10·3	21 36 57	+77 58·2	1886	H	484
R Cassiopeiæ ...	23 53 19	+50 49·9	23 51 4	+50 34·9	1887	H	429·5

* At epoch given by Chandler; but there is a secular variation.

Method of Observation.

35. Sir C. PEEK determined, for good reasons * given in § 15, to make all the observations so far as possible with the same instrument, the field of which is roughly a square degree. Within this field there are sometimes no stars of magnitude very close to that of the variable, especially near maximum; and hence the comparisons were often made with stars differing considerably in brightness from the variable: *e.g.* so much as 2, 3, or even 4 magnitudes; whereas the "method of ARGELANDER," as usually understood, is concerned only with tenths of a magnitude. To diminish the accidental errors which are naturally increased by this extension of the method it was determined to make comparisons with at least *five* separate stars whenever possible; and this decision itself further expanded the limits within which comparisons were made.

36. It must be confessed that this method gives an appearance of roughness to the observations at first sight; and it was owing to some doubt as to their value that I wrote, as already mentioned, to Professor E. C. PICKERING. His confident reply (see § 2) did much to reassure me. "Large intervals not exceeding a magnitude," he wrote, "can be estimated nearly as accurately as small ones (see *Harvard Annals*, vol. xxix. p. 175, and also vol. xiv. p. 349, and vol. xxiii. p. 185)." The results of my own detailed examination have been to confirm his opinion of the value of the observations; and it certainly seems that this novel plan of observation has many advantages which may recommend it to others.

37. One point deserves emphasis. The observations were not only made with the same instrument, by the same observer, on the same plan, but with remarkable regularity and continuity. It is not often possible for an observer to work so

* It is well known that if two differently coloured lights are estimated equal, and then the intensity of both is altered in the same ratio, the equality disappears. This is known as the "PURKINJE Phenomenon." Now a variable star is usually red, and therefore of a different colour from that of the comparison stars. Hence if the two are judged equal with one instrument, they will in general not be judged equal with another instrument which gives to both a greater or less apparent intensity.

uninterruptedly as Mr. GROVER has done for the last dozen years : his holidays, for instance, have been of the rarest and briefest kind. Hence the observations afford a valuable medium for the comparison of the broken or short series of other observers.

Method of Recording.

38. In the records the symbol − means "fainter than" and + "brighter than." I have not disturbed the symbols adopted.

Scale Value.

39. In reducing observations made by ARGELANDER'S method we must first determine the value of the "steps" recorded by the observer, whether they are true tenths of a magnitude or must be multiplied by a factor. In the present case this problem is complicated by the extent over which the comparisons range. It is not to be taken for granted that if when the observer records a difference of 1·0 this corresponds to a real difference of 0·8, therefore when he records 2·0 the real difference is 1·6, or when 3·0 is recorded the real difference is 2·4 ; at any rate this is not found to be the case. The evaluation of the observer's arbitrary scale involves a good deal of numerical work, but no real difficulty ; and the process adopted was as follows :—

40. Confining our attention in the first instance to the observations made from about 1892 onwards, when the Harvard comparison stars were used, and adopting the magnitudes of these stars as determined photometrically at Harvard, we compute the mean magnitude of the variable from the Rousdon observations whenever five comparisons were made.

41. Take, for instance, the following observation of *T Cassiopeiæ* :

Date.	Comparisons.					Mean Mag.
1892 Sept. 3	*f*−1·5	*g*−1·0	*h*−1·0	= *k*	*m*+0·5	9·6

The Harvard magnitudes of *f*, *g*, *h*, *k*, *m* are respectively 8·2, 8·5, 9·0, 9·4, 10·1 ; and the individual comparisons give for the magnitude of T 9·7, 9·5, 10·0, 9·4, 9·6, the mean of which is 9·6. Assuming this to be the true magnitude of the variable we have for the magnitude of *f*, according to this observation, 8·1 ; of *g*, 8·6 ; of *h*, 8·6 ; of *k*, 9·6 ; and of *m*, 10·1. Treating other nights in the same way, we get a series of values for the magnitudes of the comparison stars.

42. Now arrange the results for each star according to the recorded difference from the variable. If this record is really in magnitudes and tenths, the results will agree (in the mean of a large number) ; but if the observer has a scale of his own, the results will show systematic differences. As an example take star *f* for *T Ursæ Majoris* : the figures came out as follows :

TABLE II.

Magnitude of f (T Ursæ Majoris) deduced from the Observations (five Comparisons at least) and arranged according to the Recorded Difference for f.

Record.	Deduced Mag.	Number of Observations.	Record.	Deduced Mag.	Number of Observations.
−2·0	8·0	1	+0·5	8·4	1
−1·5	8·1	4	+0·6	8·4	4
−1·3	8·0	10	+0·7	8·5	2
−1·2	8·0	1	+0·8	8·6	2
−1·0	7·7	9	+1·0	8·4	16
−0·7	7·7	2	+1·2	8·5	2
−0·5	7·6	6	+1·3	8·2	2
−0·3	8·1	6	+1·5	8·4	6
−0·2	8·2	2	+1·7	8·5	3
0·0	8·1	4	+1·8	8·1	1
+0·2	8·0	1	+2·0	8·4	5
+0·3	8·2	5	+2·3	8·6	1

43. This single example will serve to illustrate the main features of the records, viz.

(*a*) The records cluster about ·0 and ·5; less frequently about ·2, ·3, and ·7; ·4, ·6, and ·8 are rare, and ·1 and ·9 practically absent. This "decimal equation" is not shown conspicuously well by the above example; but even there twenty-five out of the ninety-one records are +1·0 and −1·0, whereas with an even distribution we should have only four or five.

(*b*) The magnitudes deduced from negative records are brighter than those deduced from positive.

(*c*) This change is not a gradual one, but takes place almost *per saltum* in the neighbourhood of the record for equality. We can practically reconcile all the figures by adding 0·2 to the magnitudes deduced from negative records, and subtracting 0·2 from the positives. The reconciliation is not quite complete, but too much stress must not be laid on a single example.

(*d*) The change is of course not actually *per saltum*; for records of −0·2 and +0·2 would then be equivalent to equality. For records which are numerically small the correction must be diminished. But we shall find that in using this correction for its ultimate purpose (*i.e.* to correct the magnitudes of the variable) the cases of small records are so few that we may neglect this qualification.

44. We may now proceed to give an extended investigation of this feature of the records. Since it must not be taken for granted that the correction will be the same, whatever the mean brightness of the stars compared, the results were collected according to the brightness of the comparison stars. The quantities tabulated are

the differences between the magnitude deduced from any particular record and the adopted magnitude.

TABLE III.

Collected Results for Corrections to adopted Magnitude of Comparison Stars deduced from the Observations.

Record.	Brighter than 7·9.		Magnitude 8·0 to 8·4.		Magnitude 8·5 to 8·9.		Magnitude 9·0 to 9·4.		Magnitude 9·5 to 9·9.		Magnitude 10·0 to 10·4.		Magnitude 10·5 to 10·9.		Magnitude 11·0 to 11·9.		Fainter than 11·9.	
	Corr.	No. Obs.	Corr.	No. Obs.	Corr.	No. Obs.	Corr.	No. Obs.	Corr.	No. Obs.	Corr.	No. Obs.	Corr.	No. Obs.	Corr.	No. Obs.	Corr.	No. Obs.
−3·0	−·5	21	−·2	23	−·2	4	−·2	44	−·2	53	−·4	28	−·4	6	...	...	...	...
−2·5	−·3	58	−·4	32	−·1	8	−·2	36	−·1	33	−·2	30	−·4	12	−·4	6	...	...
−2·0	−·3	189	−·5	101	−·1	25	−·2	68	−·1	74	−·1	102	−·2	48	−·3	45	...	...
−1·7	−·2	27	−·4	20	−·1	11	·0	12	·0	6	+·1	9	+·1	3	−·4	4	...	...
−1·5	−·1	212	−·3	176	·0	34	−·2	52	−·1	27	−·1	34	·0	41	−·2	33	−·2	3
−1·3	−·2	167	−·3	197	−·2	57	−·2	55	−·2	58	−·1	32	−·1	26	−·2	16	...	...
−1·2	·0	40	−·3	50	−·2	23	−·2	23	−·1	13	−·2	10	...	...	...	...	−·2	5
−1·0	−·2	165	−·3	216	−·2	155	−·3	160	−·3	96	−·1	102	+·1	108	·0	129	−·3	52
−0·8	−·3	6	−·1	12	−·3	8	−·4	9	−·1	7	−·4	2	−·1	6	−·3	3	...	...
−0·7	−·1	23	−·4	44	−·1	30	−·2	45	−·2	23	−·2	16	·0	6	−·5	6	...	...
−0·6	...	...	−·3	19	·0	19	−·2	23	·0	11	−·3	6	+·1	6	−·4	4	...	...
−0·5	·0	25	−·3	62	·0	64	−·1	73	−·2	49	−·2	52	·0	45	·0	44	−·1	29
−0·4	...	...	−·1	5	−·1	6	...	...	−·2	3	+·1	2	...	...	...	...	...	...
−0·3	+·1	11	−·1	45	·0	52	−·1	78	·0	37	−·1	29	+·1	28	·0	38	·0	18
−0·2	...	...	−·2	17	·0	12	−·1	35	·0	10	·0	18	+·1	9	·0	7	...	...
0·0	+·2	17	·0	35	+·1	61	+·1	103	·0	81	−·1	82	+·1	84	·0	88	·0	58
+0·2	+·3	3	·0	14	+·1	7	+·2	36	·0	21	·0	16	+·2	8	...	...	...	...
+0·3	+·4	8	·0	43	+·1	28	+·2	52	+·2	52	·0	50	+·2	12	·0	20	+·2	28
+0·4	+·3	1	+·1	5	−·1	2	+·2	2	+·3	11	·0	5	...	...	...	...	...	...
+0·5	+·4	10	+·2	39	+·2	39	+·2	47	+·2	56	·0	75	+·2	33	+·1	53	+·3	30
+0·6	+·6	6	+·3	17	+·2	7	+·3	20	+·1	12	+·1	21	+·1	14	·0	8	...	...
+0·7	+·5	4	+·3	29	+·3	23	+·4	43	+·3	41	+·1	47	+·2	27	+·1	15	...	...
+0·8	+·6	1	+·4	13	+·5	7	+·2	10	+·1	24	+·1	9	+·2	7	·0	8	...	...
+1·0	+·6	53	+·3	139	+·3	142	+·3	164	+·2	204	+·2	208	+·2	156	+·2	103	+·2	80
+1·2	+·6	3	+·2	6	+·3	13	+·2	26	+·1	44	+·1	32	+·2	21	...	...	−·1	17
+1·3	+·7	12	+ 4	37	+·4	63	+·2	90	+·1	114	+·1	95	+·1	79	·0	38	...	...
+1·5	+·6	26	+·2	47	+·4	48	+·2	89	+·1	134	+·1	100	+·1	86	·0	66	+·1	21
+1·7	·0	3	+·3	15	+·3	10	+·2	30	+·1	48	+·1	45	·0	25	+·2	7	...	...
+2·0	+·6	18	+·2	45	+·4	39	+·1	127	+·1	150	+·1	166	+·1	167	·0	139	+·2	37
+2·5	+·4	4	+·2	7	+·3	9	+·1	35	−·1	32	+·1	25	+·2	59	·0	33	+·3	6
+3·0	...	...	+·3	6	+·5	1	+·2	31	−·1	34	·0	39	+·2	43	+·1	40	·0	3

45. From inspection of the above table we gather that the "error of record" is

(1) sensibly constant for all magnitudes outside the limits +0·4 and −0·4. We may thus take the (weighted) mean values outside these limits;

(2) nearly the same numerically for positive as for negative records. To exhibit the numerical accordance we may reverse the sign of the negative records, which is accordingly done in Table IV.

TABLE IV.

Mean Corrections to Scale.

—	Magnitude of Variable.								
	<7·9.	8·0 to 8·4.	8·5 to 8·9.	9·0 to 9·4.	9·5 to 9·9.	10·0 to 10·4.	10·5 to 10·9.	11·0 to 11·9.	>11·9.
Negative records (sign reversed)	$+\cdot20_{988}$	$+\cdot29_{962}$	$+\cdot13_{449}$	$+\cdot21_{899}$	$+\cdot18_{438}$	$+\cdot15_{422}$	$+\cdot04_{207}$	$+\cdot11_{299}$	$+\cdot23_{89}$
Positive records	$+\cdot57_{149}$	$+\cdot28_{899}$	$+\cdot33_{981}$	$+\cdot22_{712}$	$+\cdot12_{998}$	$+\cdot11_{862}$	$+\cdot15_{717}$	$+\cdot06_{819}$	$+\cdot18_{194}$
Mean	+·38	+·29	+·23	+·22	+·15	+·13	+·10	+·09	+·20
Differences ...	+·37	−·01	+·20	+·01	−·06	−·04	+·11	−·05	−·05

46. The "mean" results show that the error of record is distinctly greater for bright stars, and the "differences" that it is sensibly symmetrical, as we might expect, except in the case of bright stars, where we have the anomalous difference of +·37. Two possible causes of this anomaly suggest themselves.

47. First, the magnitudes of the comparison stars are inferred from a result for the variable, which is defective owing to the very causes we are discussing. Let us consider five possible cases, and first suppose that there is no error of record, either systematic or accidental, and that the comparisons stand as follows :

	Comparisons.					Magnitude of Variable.
(A)	$c+0\cdot5$	$d+1\cdot0$	$e+1\cdot5$	$f+2\cdot0$	$g+2\cdot5$	6·5
(B)	$c-0\cdot5$	$=d$	$e+0\cdot5$	$f+1\cdot0$	$g+1\cdot5$	7·5
(C)	$c-1\cdot0$	$d-0\cdot5$	$=e$	$f+0\cdot5$	$g+1\cdot0$	8·0
(D)	$c-1\cdot5$	$d-1\cdot0$	$e-0\cdot5$	$=f$	$g+0\cdot5$	8·5
(E)	$c-2\cdot5$	$d-2\cdot0$	$e-1\cdot5$	$f-1\cdot0$	$g-0\cdot5$	9·5

The (correctly) inferred magnitudes of the comparison stars will be $c = 7\cdot0$, $d = 7\cdot5$, $e = 8\cdot0$, $f = 8\cdot5$, $g = 9\cdot0$ in each case.

48. Now suppose that a systematic error of record is made of exactly 0·20 *numerically* in excess. The records will stand as follows :

(A)	$c+0\cdot7$	$d+1\cdot2$	$e+1\cdot7$	$f+2\cdot2$	$g+2\cdot7$	6·3
(B)	$c-0\cdot7$	$=d$	$e+0\cdot7$	$f+1\cdot2$	$g+1\cdot7$	7·4
(C)	$c-1\cdot2$	$d-0\cdot7$	$=e$	$f+0\cdot7$	$g+1\cdot2$	8·0
(D)	$c-1\cdot7$	$d-1\cdot2$	$e-0\cdot7$	$=f$	$g+0\cdot7$	8·6
(E)	$c-2\cdot7$	$d-2\cdot2$	$e-1\cdot7$	$f-1\cdot2$	$g-0\cdot7$	9·7

and the inferred magnitudes of the comparison stars will be

	c	*d*	*e*	*f*	*g*
(A)	7·0	7·5	8·0	8·5	9·0
(B)	6·7	7·4	8·1	8·6	9·1
(C)	6·8	7·3	8·0	8·7	9·2
(D)	6·9	7·4	7·9	8·6	9·3
(E)	7·0	7·5	8·0	8·5	9·0

whence it is manifest that the true "error of record" is only made apparent in case (C) when the positive and negative comparisons are equally balanced. In the extreme

cases (A) and (E), when the variable is either the brightest or faintest * star in the field, the error of record is entirely masked. Cases (B) and (D) are intermediate.

49. Now for the brighter stars case (E) does not occur. Cases (A) (B) (C) (D) do not occur with the same frequency, but for the purposes of illustration let us suppose for a moment that they do. Then the errors of record deduced would be as follows:

Negative Records.				Zero.	Positive Records				
(A)					0	0	0	0	0
(B)	−3			−1	+1	+1	+1		
(C)	−2	−2		0	+2	+2			
(D)	−1	−1	−1	+1	+3				
Mean −·17				·00	+·09				

That is, both negative and positive records give a result too small numerically, the positive more so than the negative.

50. Comparing this with the anomaly to be explained in Table IV., we see that it is precisely in the wrong direction. To make allowance for it is to increase the anomaly of Table IV., which is in greater need of explanation than before.

51. The second possible origin of the anomaly is error in the assumed magnitudes of the comparison stars. These were carefully determined at Harvard, but it will be shown later that *the Harvard magnitudes do not suit the Peek observations* in individual cases. For most of the groups in Table IV. the number of stars dealt with is large enough to eliminate these individual differences, but for the first group, positive records, the stars are only three in number, as follows:

TABLE V.

Variable.	Comparison Star.	Adopted Magnitude.	Correction to Magnitude.	
			Negative Records.	Positive Records.
R Aurigæ ...	*d*	7·7	$-·33_{18}$	$+·46_{20}$
T Cephei ...	*d*	6·7	$-·06_{102}$	$+·75_{47}$
„ ...	*f*	7·7	$·00_{22}$	$+·50_{73}$

52. Now, on referring to Table XI., it will be seen that the adopted magnitude *R Aurigæ d* requires a correction of +0·2 to suit the Peek observations; *T Cephei d* and *f*, corrections of +·2 and +·3. These corrections are to some extent arbitrary, depending on the adjustment of the whole set of stars with the Harvard series. If, for instance, in the case of *T Cephei* we make *l*, *m*, *n* agree a little better with Harvard by adding +·2 or +·3 to the whole series, then the corrections required by *d* and *f* are

* Considering that there are stars of all degrees of faintness, this expression may read strangely; but when the variable is *just discernible* it may be the faintest star *discernible* in the field. See also § 22.

still further increased. But, taking the corrections as they stand—and they were deduced without any reference to the present point—we should rewrite the table thus:

TABLE VI.

Variable.	Comparison Star.	Adopted Magnitude.	Correction to Magnitude.	
			Negative Records.	Positive Records.
R Aurigæ ...	*d*	7·9	$-\cdot 53_{18}$	$+\cdot 26_{20}$
T Cephei ...	*d*	6·9	$-\cdot 26_{102}$	$+\cdot 55_{47}$
„ ...	*f*	8·0	$-\cdot 30_{22}$	$+\cdot 20_{73}$

which reduces the mean result +·57 of Table IV. to +·32. The negative result −·20 is at the same time increased to −·23, and would doubtless be further modified if we similarly introduced the individual errors of the other stars.

53. But these were not available when it was necessary to adopt a procedure based on the results of Table IV. It was only known in a general way that the three stars in Table V. and VI. required a positive correction, and it was inferred that the anomalies of Table IV. might be set down to this cause.

54. It appears, then, that

(1) The Harvard magnitudes do not always suit the Rousdon observations, and, while keeping the general scale as far as possible the same, we may with advantage correct individual stars. We shall presently return to this point.

(2) The error of record shows a gradual decrease from brighter to fainter stars.

55. But while examining the above anomaly a further point was noticed. The different years did not seem to be consistent. A selected number of stars were examined to avoid useless labour, and the following Table VII. shows the half-difference between results from positive and negative records, *i.e.* the error of record, if this is assumed to be numerically constant for any given star:

TABLE VII.

Error of Record for different Years.

—	Mag. 7·0 (1 star).	Mag. 8·0 (4 stars).	Mag. 8·3 (6 stars).	Mag. 8·6 (6 stars).	Mag. 9·7 (8 stars).	Mag. 10·7 (11 stars).
1893	+·26	+·07	+·14	+·25	+·17	+·24
1894	+·18	+·18	+·21	+·24	+·20	+·08
1895	+·35	+·02	+·28	+·15	+·10	+·12
1896	+·26	+·24	+·25	+·20	+·05	+·04
1897	+·20	+·33	+·28	+·18	+·09	−·02
1898	+·46	+·34	+·24	+·36	+·16	+·16
1899	+·48	+·33	+·34	+·29	+·21	+·15
1900	+·57	+·32	+·35	+·35	+·18	+·14
1893–1897	+·25	+·17	+·23	+·20	+·12	+·09
1898–1900	+·50	+·33	+·31	+·33	+·18	+·15

56. There seems to have been some change about the end of 1897. On realising this, I wrote to Mr. GROVER asking whether he remembered any discontinuity, or any change of method which might affect the observations, without telling him the nature of the suspected change. He replied (1902 Jan. 7): "I am quite at a loss to assign the cause for any change of my personality about the end of 1897 or beginning of 1898. So far as I know everything was going on just as usual, and therefore it must have been, as you say, quite unconsciously." Subsequently, on my mentioning the circumstance to Lady PEEK, she remarked at once that her late husband's close and personal supervision of the work had been necessarily relaxed from about the end of 1897 onwards. It seems quite possible that this may be the cause of the change. If Mr. GROVER compared notes with Sir C. PEEK, there may have been a restraint, however slight, on the tendency to "error of record" the removal of which allowed the tendency to increase.

57. Later, the observations made before 1893 with different comparison stars were similarly reduced, and it was found that the error of record was as follows:

TABLE VIII.

Magnitude 8 to 9.	9 to 10.	10 to 11.	11 to 12.
Error of Record +·27	+·26	+·18	+·20

58. These values agree better with the results for 1898–1900 than with those for 1893–97. It seems possible after all that Mr. GROVER's normal habit was disturbed by the adoption of a new system in 1892, and gradually returned to its old condition.

59. Without attempting to probe the reason further, it was considered that the facts concerning this "error of record" were now sufficiently understood,* and the following rule was adopted as sufficiently accurate, while allowing of easy practical application of the corrections:

RULE.—*Diminish numerically the recorded difference between Variable and Comparison Stars by the following quantities:*

TABLE IX.

Period.	When the Variable is	
	Brighter than 10·0.	Fainter than 10·0.
(A) Before 1893·0	0·3	0·2
(B) 1893·0 to 1898·0	0·2	0·1
(C) 1898·0 to 1901·0	0·3	0·2

* The corrections err if anything in numerical defect. The dilution discussed in §§ 47–49 was not fully realised when the rule was adopted.

60. Practically this was applied as follows : Count the number of + comparisons and subtract the number of − comparisons ; multiply by the proper factor given in the above rule and divide by the total number of observations. The result is entered to 0·1 in the column headed "Correction for Scale." As an example we have the following entries for *T Cassiopeiæ* in 1889 :

September 10 ...	4−0·6	5+0·5	6−0·5	7−0·3	8+0·5	8·2	−·1
September 18 ...	4−0·5	=5	6−0·5	=7	8−0·5	8·4	−·2

The year being before 1893, and the variable (8·2 and 8·4) being brighter than 10·0, the proper factor is 0·3. On September 10 we have two + signs and three − signs, leaving an excess of −1, which multiplied by 0·3 and divided by 5 (the number of comparisons) gives −0·06 which counts as −·1, and is so entered in the "Correction for Scale" column. With the next column, "Correction for Stars," we shall deal presently. Again, on September 18, there are three − signs and no + signs. The result is

$$-3\times0\cdot3/5=-\cdot18$$

which appears as −·2.

61. It will be seen that some small fractions are neglected by this simple rule : *e.g.* on September 10 the full correction 0·3 is only doubtfully applicable to such small differences as 0·6 and 0·5, and is certainly *not* applicable to the difference 0·3. But these small differences are of comparatively rare occurrence, and it was not considered necessary to take special account of them. It will be seen by glancing down the column "Correction for Scale" in the printed results on pp. 1 to 129 that the correction rarely exceeds 0·1 or 0·2 ; and so long as it is right in the mean we need not affect a false accuracy in individual cases.

Possible Error due to Position-angle.

62. In addition to the general error of scale investigated above, there is another systematic error which may affect visual comparisons of stars, to which special attention has been drawn recently by Mr. A. W. Roberts, of Lovedale, South Africa. It has been found that if two stars, *a* and *b*, are equally bright, and if the field of view is in any way rotated, then sometimes *a* will appear brighter and sometimes fainter than *b*. There is a subjective systematic error of estimation depending on position-angle. Mr. A. W. Roberts investigated this subjective error in his own case by the simple expedient of using two eyepieces, one erecting, the other inverting, at each observation ; so that the line joining any two stars was apparently rotated through 180°. Tabulating his results (see *Monthly Notices R.A.S.* lvii. p. 483 and lix. p. 524) he finds that the apparent difference in brightness between two stars may differ by more

than a whole magnitude, the maxima being in position-angles nearly vertical, but not quite, the angle in his case being about 30° from the vertical.

63. With these results in mind, I examined the Rousdon observations for evidence of a similar error. Since the circumpolar variables are observed all the year round, there is plenty of material for detecting the influence of position-angle on the estimates. Unfortunately the time of making the observations has not usually been recorded. It was not until 1900, after a conversation with Sir C. PEEK, in which I drew his attention to this particular form of error, that the practice was adopted of recording the G.M.T. of the observation. Mr. GROVER'S habits have, however, been very regular throughout; and we may infer the G.M.T. of the observations within narrow limits, with quite sufficient accuracy for our present purpose.

64. I will first set down here his hours of observation as he described them to me himself (1901 March 22):

"During the winter months, immediately after five o'clock tea, I observe for about an hour and a half. In that time five, six, seven, or eight variables are observed, and that is the evening's work. As spring comes on the time gets later, but there is a meteorological round at nine; and when it gets too late to complete the observations before nine, work is not commenced until after the round is made. For stars which are at minimum in June I get up at midnight, as the sky is not dark enough at the usual time to see faint stars."

65. We can thus construct a table of approximate times for the observations, either from the statements themselves or from the actual times recorded in 1900, which from the regularity of the observer's habits will apply fairly well to other years. The sidereal time of observation is approximately as follows:

TABLE X.

	h		h		h		h
Jan.	3	Apr.	11	July	18	Oct.	22
Feb.	5	May	13	Aug.	19	Nov.	23
Mar.	8	June	16	Sept.	21	Dec.	0

The hour-angle at which any given star is observed will thus change with tolerable regularity throughout the year, with one exception still to be noticed. Most of the circumpolar stars culminate near the zenith, and near culmination they cannot be observed, as the telescope comes against the pier. The impossible positions are from hour-angles $0^h\ 0^m$ to $\pm\ 0^h\ 40^m$; and again from $\pm\ 1^h$ to $\pm\ 2^h$. For a brief interval on either side of the meridian between $0^h\ 40^m$ and $1^h\ 0^m$ the star can be observed in a rather strained position, and observations are often secured then. The position of the head is such that if the observer were lying on his back (instead of standing, as he actually does, with his head thrown back) his legs would be to the north; and as regards the position of the field with respect to the line joining the eyes no special discontinuity is introduced into the gradual change throughout the year.

66. We may now examine how the position of the field changes. Let Z be the zenith, P the pole, S the star. The line PS may be taken as defining the position of the field, and ZS as the vertical plane; so that we have to follow the changes in the angle S. These depend of course on the N.P.D. of the star; but as most of the stars with which we are concerned pass *near* the zenith let us first consider the case of a star which does actually pass through the zenith, so that PS = PZ, or in the usual notation for a triangle $z = s = \frac{\pi}{2} - \phi$, where ϕ is the latitude of Rousdon. We have

FIG. 1.

$$\cot s \sin z = \cos z \cos P + \sin P \cot S$$

or $$\sin \phi(1 - \cos P) = \sin P \cot S$$

or $$\cot S = \sin \phi \,.\, \tan \tfrac{1}{2}P.$$

Thus cot S and tan $\frac{1}{2}$P are zero and infinite together, or we have

P =	0°	90°	180°	270°	360°
S =	90	α	0	α	−90

where cot α = sin ϕ. The gradual rotation of the field is thus limited to 180°, the rest of the circuit being completed by a *volta-fece* as the star passes the zenith, when, as already remarked, observations are made under rather exceptional conditions.

67. If the star is nearer the pole (as, for instance, *S Cephei*, Dec. +78°) the rotation of the field is performed without this sudden discontinuity. *S Cephei* is rather a difficult star to observe, being very red; the next best are *R Ursæ Minoris* (72° 29′) and *S Cassiopeiæ* (72° 5′); but there is always an awkwardness near the zenith, and too much stress must not be laid on the observations near upper culmination.

68. A few examples will now be given showing approximately the effect of position angle.

S Cygni.—The series of comparison stars *d*, *f*, *g*, *k*, *l* occurs frequently; limiting the investigation to occasions when this series was used, the following mean differences from the variable were recorded at different times of year, a constant being added to reduce the mean of each series to zero.

Month.	No. Obs.	*d.*	*f.*	*g.*	*k.*	*l.*
Jan. and Feb.	4	−1·4	−0·1	−0·3	+1·0	+1·0
Mar. and Apr.	9	−1·8	−0·2	−0·2	+1·0	+1·0
May and June	11	−1·0	−0·3	−0·2	+0·7	+0·8
July and Aug.	11	−0·9	−0·1	−0·2	+0·5	+0·6
Sept. and Oct.	6	−0·9	−0·2	−0·3	+0·8	+0·8
Nov. and Dec.	5	−1·3	+0·1	−0·5	+0·8	+0·8

(The observations have been corrected approximately for the systematic scale error. Any error arising from adopted magnitudes is common to the whole series and need not concern us.)

69. The R.A. of *S Cygni* being $20^h\ 3^m$, it is observed at lower culmination in March,

and about the end of August it is in the awkward position near upper culmination during the usual observing hours. From September to December f is approximately above g (in the telescope), and is judged fainter than g; in May and June this relative position is reversed and f is judged 0·1 brighter than g. The effect is small, and may be diluted by a tendency to record the same number for both stars, which the observer sometimes betrays in cases where two comparison stars are of nearly the same brightness. So far as it goes the indication seems to be that—

Rule—*the lower star in the field is judged too bright.*

Let us adopt this as the rule and see whether other cases follow it.

70. The greatest variation is shown in the records for d, which is close to the variable, and north of it. But the numbers represent comparisons of d with the mean

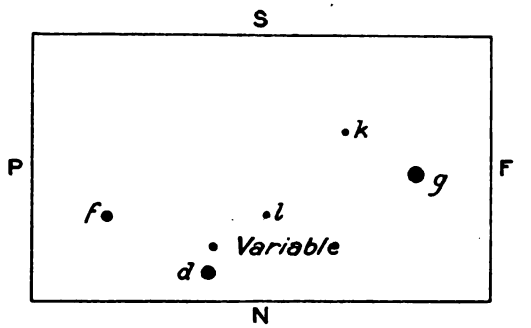


Fig. 2.
Rough chart for *S Cygni.*

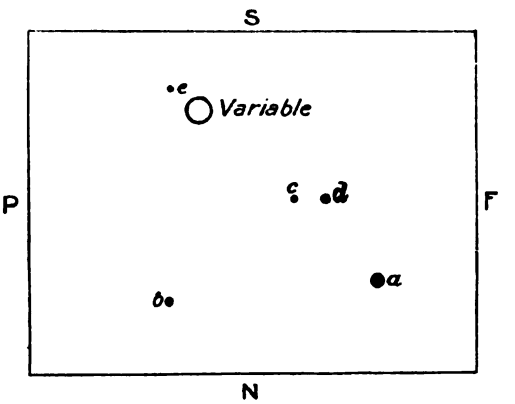


Fig. 3.
Rough chart for *T Draconis.*

of the other stars rather than with the variable. In any case d is the lowest star of the whole set at lower culmination, *i.e.* in March; and is then judged too bright, which agrees with above.

71. Now it will be noticed that the stars d, l, k are nearly in line; and the difference kl ought to be affected as much as the difference ld. But the difference recorded for kl is sensibly constant. We may probably ascribe this to the tendency above mentioned; when two comparison stars are nearly equal the observer often sets down the same number for both. Still, if the variation recorded for d is to be taken as a real habit of the observer, it is remarkable that he did not sometimes record differences of 0·5, or even 1·0, between k and l.

72. *T Ursæ Majoris.*—The difference $h-k$ was tabulated for each month. The mean results are:

	$h-k$	No. Obs.		$h-k$	No. Obs.		$h-k$	No. Obs.
Jan.	·8	12	May	·9	9	Sept.	·6	11
Feb.	·6	10	June	·8	6	Oct.	·5	11
Mar.	·7	12	July	·6	8	Nov.	·9	8
Apr.	·7	12	Aug.	·4	6	Dec.	·5	9

The R.A. of *T Ursæ Majoris* is $12^h\ 31^m$, and it thus culminates at end of April. The star *h* precedes *k* at nearly the same declination, and hence is higher in the telescope field in May, June, and July, when it is judged 0·8 mag. brighter; and lower in February, March, and April, when it is judged 0·7 mag. brighter. The difference is only 0·1 mag. and is in the *wrong* direction.

73. *T Draconis.* The differences of *a*, *b*, *c*, *e* from *d* were collected. This was before the error of scale was worked out, and no corrections have been made for scale; the means are therefore crude. Taking the mean differences of magnitude to be

$$a-d=+2\cdot8,\quad b-d=+1\cdot5,\quad c-d=+1\cdot0,\quad e-d=-0\cdot7$$

the following variations from these means are found in different months in tenths of a magnitude:

—	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
$a-d$ ...	−1	−4	−2	0	+1	+1	+1	+4	+2	+1	−1	−1
$b-d$ ..	−1	−1	−3	−4	−1	0	+1	+4	+2	+5	−2	0
$c-d$ ...	0	0	−2	−1	0	+2	+2	+1	−1	+1	−1	−1
$e-d$ ...	−2	−1	−1	+4	+3	+2	+3	+2	0	−4	−3	−3
$a-e$ ...	+1	−3	−1	−4	−2	−1	−2	+2	+2	+5	+2	+2
$b-e$ ...	+1	0	−2	−8	−4	−2	−2	+2	+2	+9	+1	+3

74. The *R.A.* of *T Draconis* is $17^h\ 54^m$, and it is at upper culmination in July, when *a* is above *d*. In February and March *a* is below *d* in the telescope field, and is judged too *faint*; not too bright, as in the rule we started with.

75. Again *b* precedes *a* at nearly the same declination, and hence is higher in the telescope field in August and September; lower in May and June. The difference $(a-b)$ formed by subtracting $(b-d)$ from $(a-d)$ is zero in the first case and +1 in the second; a small difference in the direction of the rule.

76. Again, the line joining *be* comes into positions occupied by *ae* after an interval of one or two months. But in the values for $a-e$ and $b-e$ (which have been found by subtracting $e-d$ from $a-d$ and $b-d$ respectively) we cannot trace any interval of this kind.

77. A number of other cases were examined, but those already given are probably sufficient to show that the evidence is conflicting. Various hypotheses were tried, such as that the maximum effect was at an angle with the vertical, as suggested by Mr. A. W. ROBERTS; that it affected chiefly bright stars, and so on. But no satisfactory conclusion was reached beyond the fact that the mean effect on the estimated magnitude of the variable was probably small. It is possible that some other investigator may find a clue which will elucidate the matter, but for the present it was determined to abandon further inquiry in this direction.

Magnitudes of the Comparison Stars.

78. It has already been remarked (see § 41) that the magnitudes of the comparison stars can be deduced from the records; and it is important to determine whether these agree with the adopted values as determined at Harvard or not. Professor PICKERING, if I rightly understand him, attaches considerable importance to this part of the work. I may perhaps quote the following letter, which only reached Sir CUTHBERT PEEK after he had become ill, and was handed on to me:

"Harvard College Observatory, 1901 Jan. 23.

"MY DEAR SIR,—The value of your excellent observations of variable stars would be still further increased if they could be reduced to a uniform scale of magnitudes. We have now the material for doing this for a large number of the stars. Sixteen sequences of stars are discussed in our *Annals*, vol. xxxvii., Part I., of which a copy has been sent to you. Besides these, we have sixty more sequences nearly completed. A large portion of these regions are covered by HAGEN'S Charts, and for them we have the means of passing from his grades to photometric magnitudes. Your observations, as I understand them, would furnish a means of determining the brightness of nearly all of the stars on many of his charts, and thus give their magnitudes. Would it not be worth while to do this for certain stars, and then decide whether this method of reduction should be applied or not? I shall be glad to furnish you the photometric magnitudes required if you wish them.

"Very truly yours,

(*Signed*) "E. C. PICKERING.

"To Sir Cuthbert Peek."

79. I therefore paid special attention to this part of the work. Unfortunately it proved to be one of exceptional difficulty, and has been chiefly responsible for the somewhat long delay in publishing the observations. The difficulties were tiresome rather than puzzling, and arose from the necessity of adopting some simple and approximate course instead of the straightforward one which involved almost prohibitive labour. It was necessary to make experimental tests of different methods, and often in such cases the work could not be given to a computer, but must await an interval of leisure when I could give it personal attention. After all, I am not too well satisfied with the results, and it is probable that they can be improved upon; but I hope that they are at any rate good enough to help anyone who attempts such improvement, and they throw some light upon the general nature of the corrections to be expected.

80. To explain what has actually been done, we may recur to the example already quoted in § 41.

Date.	Comparisons.					Mean Mag.	Correction Scale.
1892 September 3	$f-1\cdot5$	$g-1\cdot0$	$h-1\cdot0$	$=k$	$m+0\cdot5$	9·6	−·1

We may now include the column for "Scale Correction" which has been explained in what precedes. The inferred magnitude of f will now be deduced from a *corrected* mean magnitude 9·5 by the application of $-1\cdot5$ *corrected* (*i.e.* of $-1\cdot2$), the inferred magnitude being

$$9\cdot5-1\cdot2=8\cdot3$$

whereas before we had $9\cdot6-1\cdot5=8\cdot1$.

81. Hence the rule of formation is

$$f=\mathrm{M}+\mathrm{S}+(\mathrm{D}-d)$$

where M is the number in column "Mean Mag.," S in column "Scale Correction," D the recorded comparison, and d the numerical correction to it as indicated in Table IX.

82. So far there is no difficulty either about the individual example or the general mean. The general mean is obtained most easily by arranging the inferred values of f in three groups, according as the difference between f and the variable is

I. Negative and numerically greater than 0·4.
II. Between −0·4 and +0·4 inclusive.
III. Positive and numerically greater than 0·4.

83. It has already been decided that the same corrections d can be applied to all the "differences" in Group I., except so far as a change is indicated in Table IX., and similarly for Group III., while we may take Group II. as not needing correction. We may therefore apply the corrections d to the means of the groups instead of to each separate observation. Further, since the formula used in the processes described in § 41 &c. was

$$f=\mathrm{M}+\mathrm{D}$$

and we accordingly have the mean values of M + D already formed for most of the stars, a great deal of the work need not be repeated. It will suffice to find the mean value of S and apply it to the mean value of M + D.

84. In Table XI. the results of the work thus indicated are shown.

Column 1 gives the reference number or letter used at Rousdon. For the numbered series the letter is added when the star is also included in the lettered series. Those stars which have only been used a few times are given at the end of the list.

Columns 2 and 3 give the "standard coordinates" with reference to the variable, as will be presently explained (see § 108).

Column 4 gives the magnitude adopted in forming M the "mean magnitude" of the variable, in the first instance, uncorrected for the Rousdon arbitrary scale.

Columns 5, 6, and 7 give the means of (M+D) for the three groups above mentioned, the subscript figures denoting the number of times on which each has been compared with the variable *in a group of five observations.* It was made a rule only to use the groups of five observations throughout, but a few deviations from this rule have occasionally crept into the work, and it would be difficult, and scarcely worth the trouble, to detect and eliminate them. The exceptions have chiefly arisen from the inclusion, in the first instance, of a star only observed in all two or three times, which has been afterwards rejected, thus reducing some groups of five observations to four only. Such cases are, however, not numerous. In columns 5, 6, and 7 of Table XI., moreover, observations where D exceeds two magnitudes have also generally been neglected.

Column 8 contains the mean value of

$$M+(D-d)$$

which is readily formed from columns 5, 6, and 7. If d were constant its mean value would be obtained from the excess of the number of observations in column 4 over that in column 6, divided by the total no. obs. shown in column 8. The necessary allowance for the changes of Table IX. has been made by the following approximate rules:

If the *comparison star* is brighter than 10·0 the second column of Table IX. has been used; and if fainter, the third.

For stars observed in more than one of the periods A, B, C the mean value for the periods of observation has been taken.

Column 9 gives the mean value of S, formed from the column "Corr. Scale" in the printed observations.

Column 10 gives the excess of the sum of columns 8 and 9 over the "Adopted Mag." in column 4.

Column 11 we proceed to consider.

N.B.—When only the first four columns are given the comparison stars have been occasionally used, but not sufficiently observed to allow of corrections being deduced.

TABLE XI.

Variable.	Number or Letter.	Peek Coords. x	Peek Coords. y	Adopted Mag.	In'erred Magnitude. −2·0 to −0·5.	In'erred Magnitude. −0·4 to +0·4.	In'erred Magnitude. +0·5 to +2·0.	In'erred Magnitude. Mean.	Correction for Scale.	Inferred Correction.	Adopted Correction.
T Cassiopeiæ ...	3	−5·6	−0·9	7·4	$7{\cdot}13_3$	$7{\cdot}30_4$	$7{\cdot}60_4$	$7{\cdot}35_9$	+·21	+·16	+·2
	4	−2·6	+5·0	7·8	$7{\cdot}67_{17}$	$7{\cdot}77_{13}$	$7{\cdot}90_7$	$7{\cdot}83_{37}$	+·05	+·08	+·1
	5	−1·9	+2·4	8·3	$8{\cdot}26_{10}$	$8{\cdot}32_{13}$	$8{\cdot}44_{18}$	$8{\cdot}30_{42}$	+·02	+·02	·0
	6*e*	+0·4	+0·2	7·9	$7{\cdot}79_{33}$	$7{\cdot}83_7$	$8{\cdot}04_{13}$	$7{\cdot}98_{53}$	+·01	+·09	+·1
	7*g*	+2·1	−2·8	8·3	$8{\cdot}18_{13}$	$8{\cdot}25_{17}$	$8{\cdot}44_{19}$	$8{\cdot}26_{49}$	+·01	−·03	·0
	8*f*	+0·5	−5·0	8·2	$7{\cdot}96_{16}$	$8{\cdot}06_{14}$	$8{\cdot}21_{11}$	$8{\cdot}10_{41}$	+·02	−·08	−·1
	9*l*	−2·9	−0·7	10·0	$9\,63_{13}$	$9{\cdot}91_8$	$10{\cdot}10_{14}$	$9\,87_{35}$	−·05	−·18	−·2

Table XI.—*continued.*

Variable.	Number or Letter.	Peek Coords.		Adopted Mag.	Inferred Magnitude				Correction for Scale.	Inferred Correction.	Adopted Correction.
		x	y		−2·0 to −0·5	−0·4 to +0·4	+0·5 to +2·0	Mean.			
T Cassiopeiæ—*cont.*	13*p*	−0·3	− 1·0	11·0	$10{\cdot}50_{1}$	$11{\cdot}16_{7}$	$11{\cdot}20_{14}$	$11{\cdot}04_{22}$	·00	+·04	·0
	17*n*	−0·2	+ 1 7	10 8	$10{\cdot}45_{2}$	$10{\cdot}75_{10}$	$10{\cdot}80_{12}$	$10{\cdot}66_{25}$	−·01	−·15	−·2
	18	−1 9	+ 1 9	11 0	$10{\cdot}80_{1}$	$10{\cdot}95_{2}$	$11{\cdot}48_{8}$	$11{\cdot}19_{11}$	−·02	+·17	+·1
	1	−6·0	− 2·3	8·2	...	...	...	...	...	...	...
	11	−6·7	+ 2 3	8·5	...	...	...	...	...	...	...
	12	−6 1	+ 0 6	10 0	...	...	...	...	...	...	...
	14	−1·0	− 0·6	11·2	...	...	...	...	...	...	...
	15	+1·0	+ 1 8	10 7	...	...	...	...	...	...	...
	16	+0·3	+ 2·1	10·5	...	...	...	...	...	...	...
	19	−2·6	+ 2 1	11·0	...	...	...	...	...	...	...
	20	−3·6	+ 2·1	10·5	...	...	...	...	...	...	...
	21	−2·5	+ 0·3	10·0	...	...	...	...	...	...	...
	b	+5·5	+10 3	6·5	$6{\cdot}32_{9}$	$7{\cdot}00_{1}$	...	$6{\cdot}61_{10}$	+·02	+·13	+·1
	d	+5 0	− 3·5	7·2	$6{\cdot}80_{28}$	$6{\cdot}93_{3}$	$8{\cdot}10_{1}$	$7{\cdot}07_{72}$	+·03	−·10	−·2
	e	+0·4	+ 0·2	7 9	$7{\cdot}79_{100}$	$8{\cdot}02_{22}$	$8{\cdot}35_{24}$	$8{\cdot}06_{186}$	·00	+·16	+·1
	f	+0·5	− 5·0	8·2	$8{\cdot}15_{0}$	$8{\cdot}27_{69}$	$8{\cdot}48_{38}$	$8{\cdot}32_{163}$	+·01	+·13	+·1
	g	+2·1	− 2·8	8·5	$8{\cdot}44_{68}$	$8{\cdot}54_{41}$	$8{\cdot}78_{61}$	$8{\cdot}59_{164}$	·00	+·09	·0
	h	+4·8	− 1·1	9·0	$8{\cdot}71_{22}$	$9{\cdot}26_{15}$	...	$9{\cdot}17_{37}$	−·04	+·13	+·1
	k	+5·6	0 0	9·4	$9{\cdot}70_{21}$	$9{\cdot}46_{10}$	$9{\cdot}52_{8}$	$9{\cdot}74_{39}$	−·05	+·29	+·2
	l	−2·9	− 0·7	9·8	$9{\cdot}74_{28}$	$9{\cdot}76_{24}$	$9{\cdot}86_{94}$	$9{\cdot}72_{138}$	−·02	−·10	−·2
	m	+2·7	− 1·0	10·1	$10{\cdot}11_{18}$	$10{\cdot}22_{22}$	$10{\cdot}20_{57}$	$10{\cdot}13_{109}$	−·05	−·02	−·1
	n	−0·2	+ 1·7	10·5	$11{\cdot}00_{2}$	$11{\cdot}00_{1}$	$10{\cdot}85_{4}$	$10{\cdot}84_{7}$	−·04	+·30	+·3
	p	−0·3	− 1·0	11·3	...	$10{\cdot}88_{9}$	$11{\cdot}18_{21}$	$10{\cdot}94_{30}$	−·05	−·41	−·6
	o	+5·1	+11·9	6·9	...	...	...	...	...	...	...
	q	+0·4	+ 0 2	12·1	...	...	...	...	...	...	...
	r	−0·3	− 0·2	12·4	...	...	...	...	...	...	...
S Cassiopeiæ ...	1*b*	−1·0	−2·9	7·0	$6{\cdot}76_{8}$	...	...	$7{\cdot}06_{8}$	+·01	+·07	+·1
	2*o*	−1·0	+3·4	7·0	$7{\cdot}00_{12}$	...	...	$7{\cdot}30_{12}$	+·05	+·35	+·4
	3	+4·0	+2·6	7·2	$7{\cdot}17_{7}$	...	...	$7{\cdot}47_{7}$	−·03	+·24	+·3
	4	+0·3	+1·8	8·7	$8{\cdot}36_{9}$	$8{\cdot}55_{4}$	$8{\cdot}74_{8}$	$8{\cdot}55_{21}$	+·08	−·07	−·1
	6*g*	−4·7	−1·4	9·0	$8{\cdot}64_{7}$	$8{\cdot}71_{7}$	$9{\cdot}37_{16}$	$8{\cdot}93_{30}$	+·07	−·00	·0
	8	−2·6	−2·2	10·0	$9{\cdot}40_{5}$	$9{\cdot}75_{6}$	$10{\cdot}07_{18}$	$9{\cdot}76_{29}$	+·09	−·15	−·2
	10*m*	−0·5	+1·3	10·4	$10{\cdot}21_{11}$	$10{\cdot}27_{6}$	$10{\cdot}45_{18}$	$10{\cdot}30_{35}$	+·01	−·09	−·1
	12*l*	+1·1	+0·1	10·4	$10{\cdot}37_{15}$	$10{\cdot}54_{5}$	$10{\cdot}75_{18}$	$10{\cdot}56_{38}$	+·01	+·17	+·2
	13*k*	+0·4	−0 6	10·2	$10{\cdot}14_{16}$	$10{\cdot}57_{4}$	$10{\cdot}67_{17}$	$10{\cdot}42_{37}$	−·01	+·21	+·2
	15*o*	+0·5	−3·2	10·9	$10{\cdot}98_{5}$	$11{\cdot}36_{7}$	$11{\cdot}15_{2}$	$11{\cdot}23_{14}$	−·11	+·22	+·3
	16*n*	+1·7	−3·0	10·9	$10{\cdot}73_{10}$	$11{\cdot}35_{8}$	$11{\cdot}20_{2}$	$11{\cdot}08_{18}$	−·11	+·07	+·2
	17	+0·9	−2·6	10·6	$9{\cdot}92_{5}$	$10{\cdot}13_{7}$	$10{\cdot}35_{6}$	$10{\cdot}13_{18}$	+·04	−·43	−·5
	7	−4·6	+4·5	9·4	...	...	...	...	...	...	...
	9	−1·7	+2·2	10·4	...	...	...	...	...	...	...
	11	−0·7	+0·7	11·0	...	...	...	...	...	...	...
	18	+0·1	−0·5	11·5	...	...	...	...	...	...	...
	19	−0·4	+0·4	12·5	...	...	...	...	...	...	...
	24	−0·1	−0·7	11·5	...	...	...	...	...	...	...
	27	+1·2	0·0	11·5	...	...	...	...	...	...	...
	30	+0·2	+0·2	13·2	...	...	...	...	...	...	...
	a	−0·7	+0·7	11·0	...	...	...	...	...	...	...
	b	−1·0	−2·9	7·0	$7{\cdot}02_{40}$	...	...	$7{\cdot}27_{40}$	+·02	+·29	+·3

Table XI.—*continued.*

Variable.	Number or Letter.	Peek Coords.		Adopted Mag.	Inferred Magnitude.				Correction for Scale.	Inferred Correction.	Adopted Correction.
		x	y		−2·0 to −0·5	−0·4 to +0·4	+0·5 to +2·0	Mean.			
S Cassiopeiæ—*cont*	*c*	−1·0	+3·4	7·3	$7{\cdot}21_{29}$	...	...	$7{\cdot}46_{19}$	+·02	+·18	+·2
	g	−4·7	−1·4	8·8	$8{\cdot}43_{22}$	$8\,68_{16}$	$9{\cdot}09_{17}$	$8\,72_{45}$	+·02	−·06	−·1
	k	+0·4	−0·6	9·8	$9{\cdot}88_{40}$	$10{\cdot}03_{7}$	$10{\cdot}10_{42}$	$9{\cdot}97_{109}$	−·02	+·15	+·1
	l	+1·1	+0·1	10·1	$10{\cdot}19_{39}$	$10{\cdot}40_{6}$	$10{\cdot}17_{64}$	$10{\cdot}15_{110}$	−·02	+·03	·0
	m	−0·5	+1·3	10·4	$10{\cdot}17_{42}$	$10{\cdot}22_{9}$	$10{\cdot}30_{25}$	$10\,21_{86}$	−·03	−·22	−·3
	n	+1·7	−3·0	10·8	$10{\cdot}94_{22}$	$11{\cdot}03_{7}$	$11{\cdot}00_{20}$	$11{\cdot}00_{50}$	−·05	+·15	·0
	o	+0·5	−3·2	11·1	$10{\cdot}88_{23}$	$10{\cdot}88_{12}$	$11{\cdot}05_{11}$	$10{\cdot}97_{51}$	−·07	−·20	−·3
	p	+0·7	−1·4	11·5	$11{\cdot}85_{6}$	...	$12{\cdot}07_{3}$	$11{\cdot}97_{9}$	−·10	+·37	+·3
	e	+9·8	+3·1	8·1	...	...	...	...	...	...	...
	f	+11·4	+3·7	8·4	...	...	...	...	...	...	...
	r	+0·1	−0·9	12·3	...	...	...	...	...	...	...
	s	−0·8	−0·4	13·2	...	...	...	...	...	...	...
S Persei	*a*	−1·4	+6·9	7·8	$7{\cdot}42_{56}$	...	...	$7{\cdot}67_{56}$	+·04	−·09	−·1
	b	+5·7	+3·7	8·1	$7{\cdot}87_{120}$	$8{\cdot}05_{15}$	$8{\cdot}33_{7}$	$8{\cdot}11_{142}$	+·04	+·05	·0
	c	−1·9	−0·3	8·4	$8{\cdot}01_{120}$	$8{\cdot}23_{20}$	$8{\cdot}44_{12}$	$8{\cdot}25_{152}$	+·04	−·11	−·1
	f	−2·8	−1·3	9·1	$8{\cdot}90_{20}$	$9{\cdot}20_{17}$	$9{\cdot}49_{66}$	$9{\cdot}21_{102}$	+·04	+·15	+·1
	g	−2·6	−1·8	9·5	$9{\cdot}40_{3}$	$9{\cdot}90_{12}$	$10{\cdot}09_{110}$	$9{\cdot}85_{135}$	+·04	+·39	+·4
	k	+0·1	+1·3	10·7	...	...	$11{\cdot}00_{41}$	$10{\cdot}85_{41}$	+·06	+·21	+·2
	l	0·0	+0·3	11·3	...	...	$11{\cdot}39_{28}$	$11{\cdot}24_{28}$	+·01	−·05	−·1
	m	−0·1	−0·9	11·8	...	...	...	...	...	...	...
R Aurigæ	3*a*	−4·9	−4·3	6·1	$5{\cdot}98_{12}$	...	...	$6{\cdot}28_{13}$	+·18	+·36	+·3
	4*e*	−1·3	−1·1	8·1	$7{\cdot}82_{13}$	$8{\cdot}08_{4}$	$8{\cdot}37_{10}$	$8{\cdot}09_{27}$	+·11	+·10	·0
	5	−1·0	−3·3	9·4	$9{\cdot}30_{1}$	$9{\cdot}47_{2}$	$9{\cdot}52_{15}$	$9{\cdot}28_{19}$	+·11	−·01	−·2
	6*g*	−0·2	−0·2	9·4	$9{\cdot}17_{15}$	$9{\cdot}17_{11}$	$9{\cdot}71_{11}$	$9{\cdot}36_{37}$	+·04	·00	−·1
	7*f*	+0·2	+1·1	9·2	$8{\cdot}64_{12}$	$8{\cdot}75_{9}$	$8{\cdot}92_{16}$	$8{\cdot}75_{38}$	+·09	−·36	−·5
	8	+0·2	+3·5	9·0	$9{\cdot}10_{1}$	$8{\cdot}90_{3}$	$9{\cdot}57_{7}$	$9{\cdot}19_{11}$	+·12	+·31	+·2
	9	−0·2	−4·5	9·0	$9{\cdot}00_{1}$	$8{\cdot}92_{5}$	$9{\cdot}00_{14}$	$8{\cdot}78_{20}$	+·14	−·08	−·2
	12*m*	−0·3	−1·6	10·9	$10{\cdot}30_{5}$	$11{\cdot}00_{3}$	$11{\cdot}33_{6}$	$10{\cdot}89_{14}$	−·05	−·06	−·1
	25	−2·7	−0·2	9·7	$9{\cdot}64_{8}$	$9{\cdot}72_{6}$	$10{\cdot}13_{8}$	$9{\cdot}84_{20}$	−·02	+·12	+·1
	26*k*	−1·9	−0·8	9·7	$9{\cdot}61_{11}$	$9{\cdot}80_{5}$	$9{\cdot}97_{7}$	$9{\cdot}81_{23}$	−·04	+·07	·0
	29	−1·8	+0·4	10·8	$10{\cdot}55_{2}$	$11{\cdot}17_{7}$	$11{\cdot}24_{11}$	$11{\cdot}06_{20}$	·00	+·26	+·3
	1	−6·3	+4·9	7·6	...	...	...	...	...	...	...
	2*d*	−1·3	+6·9	7·6	...	...	...	...	...	...	...
	11	+0·9	−1·8	9·5	...	...	...	...	...	...	...
	13*l*	+0·7	−0·8	10·7	...	...	...	...	...	...	...
	15	+0·3	+3·6	10·8	...	...	...	...	...	...	...
	18	−4·3	−3·8	10·0	...	...	...	...	...	...	...
	27	−3·5	+1·7	10·9	...	...	...	...	...	...	...
	35	−2·4	0·0	11·1	...	...	...	...	...	...	...
	36	−2·1	0·0	11·1	...	...	...	...	...	...	...
	37	−0·7	+0·5	11·3	...	...	...	...	...	...	...
	38	−0·6	−0·2	11·7	...	...	...	...	...	...	...
	a	−4·9	−4·3	6·2	$5{\cdot}97_{47}$	...	...	$6{\cdot}22_{47}$	+·07	+·09	+·2
	d	−1·3	+6·9	7·7	$7{\cdot}36_{18}$	$7{\cdot}82_{12}$	$8{\cdot}11_{20}$	$7{\cdot}76_{50}$	+·07	+·13	+·2
	e	−1·3	−1·1	8·2	$7{\cdot}68_{44}$	$7{\cdot}86_{10}$	$8\,19_{28}$	$7{\cdot}92_{82}$	+·05	−·23	−·2
	f	+0·2	+1·1	8·8	$8{\cdot}81_{30}$	$8{\cdot}74_{18}$	$9{\cdot}00_{31}$	$8\,88_{119}$	+·03	+·11	+·2
	g	−0·2	−0·2	9·3	$9{\cdot}34_{46}$	$9{\cdot}37_{12}$	$9{\cdot}50_{41}$	$9{\cdot}41_{119}$	+·02	+·13	+·2
	h	+1·0	−2·0	9·7	$9{\cdot}81_{21}$	$9{\cdot}84_{22}$	$10{\cdot}03_{30}$	$9{\cdot}90_{84}$	−·02	+·18	+·2

TABLE XI.—*continued.*

Variable.	Number or Letter.	Peek Coords.		Adopted Mag.	Inferred Magnitude.				Correction for Scale.	Inferred Correction.	Adopted Correction.
		x	y		−2·0 to −0·5	−0·4 to +0·4	+0·5 to +2·0	Mean.			
R Aurigæ—*cont.*	k	−1·9	−0·8	10·3	$9{\cdot}93_{14}$	$10{\cdot}10_{4}$	$10{\cdot}04_{9}$	$10{\cdot}02_{27}$	−·02	−·30	−·3
	l	+0·7	−0·8	10·7	$10{\cdot}77_{22}$	$10{\cdot}75_{12}$	$10{\cdot}79_{28}$	$10{\cdot}74_{62}$	−·04	·00	·0
	m	−0·3	−1·6	11·1	$10{\cdot}76_{18}$	$11{\cdot}00_{13}$	$11{\cdot}04_{36}$	$10{\cdot}92_{67}$	−·04	−·22	−·2
	n	−1·8	+0·4	11·5	...	...	...	...	...	...	...
	q	−0·5	−0·2	12·8	...	...	...	...	...	...	...
U Orionis ...	1a	−4·0	+1·3	5·4	$5{\cdot}31_{42}$	...	...	$5{\cdot}61_{42}$	+·10	+·31	+·2
	2	−0·2	+3·2	7·9	$7{\cdot}68_{88}$	$7{\cdot}93_{13}$	$8{\cdot}20_{72}$	$7{\cdot}93_{118}$	+·10	+·13	·0
	3	−1·4	+3·1	8·6	$8{\cdot}47_{22}$	$8{\cdot}61_{11}$	$8{\cdot}83_{84}$	$8{\cdot}61_{117}$	+·10	+·11	·0
	4m	+0·4	−0·7	9·5	$8{\cdot}94_{20}$	$9{\cdot}22_{5}$	$9{\cdot}22_{77}$	$9{\cdot}02_{112}$	+·09	−·39	−·5
	5	−1·5	−0·8	9·4	$9{\cdot}60_{9}$	$9{\cdot}48_{4}$	$9{\cdot}75_{24}$	$9{\cdot}50_{31}$	+·12	+·22	+·1
	6	−2·6	−0·2	10·3	$10{\cdot}23_{8}$	$10{\cdot}14_{14}$	$10{\cdot}17_{9}$	$10{\cdot}11_{26}$	+·13	−·06	−·2
	7	−1·1	+2·5	9·9	$10{\cdot}14_{17}$	$10{\cdot}57_{11}$	$10{\cdot}67_{7}$	$10{\cdot}44_{35}$	−·04	+·50	+·5
	8	−0·6	+3·0	10·5	$10{\cdot}43_{6}$	$10{\cdot}88_{11}$	$11{\cdot}08_{11}$	$10{\cdot}83_{28}$	−·07	+·26	+·3
	9	−0·5	+4·0	10·2	$10{\cdot}34_{12}$	$10{\cdot}49_{9}$	$10{\cdot}65_{6}$	$10{\cdot}50_{28}$	−·08	+·22	+·3
	10	−0·1	+2·0	10·0	$9{\cdot}78_{20}$	$10{\cdot}05_{10}$	$10{\cdot}03_{24}$	$9{\cdot}95_{67}$	−·01	−·06	−·1
	11q	+0·4	0·0	10 9	$10{\cdot}21_{11}$	$10{\cdot}63_{14}$	$10{\cdot}92_{22}$	$10{\cdot}62_{47}$	−·03	−·31	−·4
	16f	−7·0	+1·5	7·4	$7{\cdot}03_{41}$	$7{\cdot}37_{15}$	$7{\cdot}61_{26}$	$7{\cdot}33_{94}$	+·12	+·05	−·1
	12	−2·6	+1·7	11·1	...	...	...	...	...	...	...
	14	−7·7	+7·3	8·1	...	...	...	...	...	...	...
	15	−7·8	+3·0	9·3	...	...	...	...	...	...	...
	17	+1·8	−1·3	9·9	...	...	...	...	...	...	...
	19	+4·0	−0·8	9·4	...	...	...	...	...	...	...
	a*	−4·0	+1·3	4·5	...	...	...	...	...	...	...
	d*	−2·4	−5·1	5·8	...	...	...	...	...	...	...
	f*	−7·0	+1·5	6·5	...	...	...	...	...	...	...
	k*	−2·4	−6·9	8·0	...	...	...	...	...	...	...
	l*	−1·8	−5·9	8·1	...	...	...	...	...	...	...
	m*	+0·4	−0·7	8·9	...	...	...	...	...	...	...
	p*	+1·5	−0·1	9·7	...	...	...	...	...	...	...
	q*	+0·3	−0·1	10·2	...	...	...	...	...	...	...
	r*	−0·3	−1·1	10 6	...	...	...	...	...	...	...
	t*	−1·2	−1·1	11·5	...	...	...	...	...	...	...
	u*	−0·9	−0·5	12·2	...	...	...	...	...	...	...
	w*	−0·3	+0·1	12·7	...	...	...	...	...	...	...
R Lyncis ...	a	+0·3	−5·5	6·7	$6{\cdot}53_{33}$	...	$7{\cdot}00_{1}$	$6{\cdot}79_{36}$	+·12	+·21	+·3
	e	−2·1	+5·4	8·6	$8{\cdot}22_{22}$	$8{\cdot}41_{9}$	$8{\cdot}87_{29}$	$8{\cdot}55_{60}$	+·10	+·05	+·1
	f	+1·2	−2·3	9·0	$8{\cdot}70_{32}$	$8{\cdot}86_{25}$	$9{\cdot}04_{54}$	$8{\cdot}87_{131}$	·00	−·13	−·1
	g	−2·1	+3·8	9·4	$9{\cdot}27_{21}$	$9{\cdot}43_{18}$	$9{\cdot}58_{49}$	$9{\cdot}40_{88}$	+·07	+·07	+·1
	h	+1·8	−3·3	9·7	$9{\cdot}72_{40}$	$9{\cdot}85_{26}$	$9{\cdot}85_{67}$	$9{\cdot}76_{133}$	+·03	+·09	+·1
	k	+0·9	+0·7	10·1	$9{\cdot}81_{40}$	$10{\cdot}02_{21}$	$10{\cdot}14_{51}$	$9{\cdot}98_{112}$	·00	−·12	−·1
	l	−2·6	+1·0	10·5	$11{\cdot}00_{27}$	$11\,05_{10}$	$11{\cdot}21_{14}$	$11{\cdot}11_{51}$	−·09	+·52	+·6
	m	−0·4	+0·8	10·7	$10{\cdot}36_{31}$	$10{\cdot}59_{14}$	$10{\cdot}71_{62}$	$10{\cdot}55_{107}$	−·01	−·16	−·1
	n	−1·8	+0·6	11·1	$11{\cdot}25_{17}$	$11{\cdot}50_{3}$	$11{\cdot}62_{8}$	$11{\cdot}43_{28}$	−·16	+·17	+·3
	d	+6·3	+4·7	8·0	...	...	...	...	...	...	...
	o	−1·5	+0·8	11·5	...	...	...	...	...	...	...

* These places are taken from *Harvard Annals*, vol. xxxvii. Part II. p. 156. The magnitudes were adopted in 1898, and in one or two cases differ by more than 0·1 from the final magnitudes there given.

Table XI.—*continued.*

Variable.	Number or Letter.	Peek Coords.		Adopted Mag.	Inferred Magnitude.				Correction for Scale.	Inferred Correction.	Adopted Correction.
		x	y		−2·0 to −0·5	−0·4 to +0·4	+0·5 to +2·0	Mean.			
R Ursæ Majoris	1*a*	−3·1	−4·0	6·5	$6{\cdot}28_{29}$	...	...	$6{\cdot}58_{29}$	+·18	+·26	+·2
	2*h*	−2·2	−1·9	8·9	$8{\cdot}15_{14}$	$8{\cdot}46_{8}$	$8{\cdot}86_{23}$	$8{\cdot}56_{45}$	+·19	−·15	−·2
	3*n*	−2·0	−2·7	9·9	$9{\cdot}43_{11}$	$9{\cdot}83_{4}$	$9{\cdot}99_{31}$	$9{\cdot}71_{46}$	+·15	−·04	−·1
	6	−0·1	−7·3	10·0	$9{\cdot}90_{2}$	$10{\cdot}20_{2}$	$10{\cdot}08_{30}$	$9{\cdot}88_{34}$	+·16	+·04	·0
	7*o*	+0·4	−6·1	9·6	$9{\cdot}33_{3}$	$9{\cdot}78_{4}$	$9{\cdot}81_{31}$	$9{\cdot}55_{38}$	+·17	+·12	+·1
	8*p*	+3·2	−1·7	10·6	$10{\cdot}26_{5}$	$10{\cdot}35_{4}$	$10{\cdot}66_{3}$	$10{\cdot}43_{17}$	+·08	−·09	−·1
	9*q*	+3·1	+0·7	10·8	$10{\cdot}68_{4}$	$10{\cdot}72_{5}$	$10{\cdot}78_{5}$	$10{\cdot}72_{14}$	+·02	−·06	·0
	10	−3·4	−1·6	10·4	$10{\cdot}09_{9}$	$10{\cdot}52_{6}$	$10{\cdot}82_{11}$	$10{\cdot}48_{20}$	+·08	+·16	+·2
	11*r*	−0·1	+1·0	11·1	$10{\cdot}72_{16}$	$11{\cdot}32_{8}$	$11{\cdot}39_{7}$	$11{\cdot}20_{29}$	−·02	+·08	+·2
	17*s*	−0·8	0·0	11·1	$11{\cdot}00_{6}$	$11{\cdot}56_{10}$	$12{\cdot}00_{7}$	$11{\cdot}54_{23}$	−·04	+·40	+·6
	19*t*	+0·1	−0·8	12·1	$12{\cdot}20_{2}$	$12{\cdot}23_{6}$	$12{\cdot}30_{5}$	$12{\cdot}21_{13}$	−·08	+·03	+·2
	20	−0·5	−1·8	11·6	$11{\cdot}45_{10}$	$11{\cdot}53_{4}$	$11{\cdot}80_{3}$	$11{\cdot}61_{17}$	−·03	−·02	+·2
	21	−1·3	−2·7	11·6	$11{\cdot}49_{7}$	$11{\cdot}82_{5}$	$12{\cdot}00_{5}$	$11{\cdot}75_{17}$	−·03	+·12	+·3
	4	−6·1	−3·5	10·2	...	...	...	...	...	...	...
	5	−5·5	−3·5	10·7	...	...	...	...	...	...	...
	13	−2·2	−6·5	10·7	...	...	...	...	...	...	...
	18*u*	−1·8	−0·5	12·0	...	...	...	...	...	...	...
	23	−0·7	−5·5	11·0	...	...	...	...	...	...	...
	25	+0·5	−1·0	12·5	...	...	...	...	...	...	...
	26	+1·2	−1·7	11·3	...	...	...	...	...	...	...
	a	−3·1	−4·0	5·9	$6{\cdot}42_{42}$	...	...	$6{\cdot}67_{42}$	+·11	+·88	+1·2
	h	−2·2	−1·9	8·2	$8{\cdot}09_{37}$	$8{\cdot}46_{18}$	$8{\cdot}88_{15}$	$8{\cdot}50_{92}$	+·12	+·42	+·6
	n	−2·0	−2·7	9·8	$9{\cdot}71_{32}$	$9{\cdot}78_{16}$	$9{\cdot}78_{68}$	$9{\cdot}68_{116}$	+·07	−·05	·0
	o	+0·4	−6·1	9·9	$9{\cdot}46_{21}$	$9{\cdot}66_{9}$	$9{\cdot}72_{75}$	$9{\cdot}53_{106}$	+·09	−·28	−·2
	p	+3·2	−1·7	10·5	$10{\cdot}27_{56}$	$10{\cdot}37_{7}$	$10{\cdot}26_{57}$	$10{\cdot}27_{120}$	+·03	−·20	−·2
	q	+3·1	+0·7	11·0	$11{\cdot}15_{83}$	$11{\cdot}07_{15}$	$11{\cdot}06_{27}$	$11{\cdot}15_{94}$	−·02	+·13	+·1
	r	−0·1	+1·0	11·5	$11{\cdot}10_{47}$	$11{\cdot}35_{18}$	$11{\cdot}59_{12}$	$11{\cdot}35_{102}$	−·04	−·19	−·3
	s	−0·8	0·0	12·0	$11{\cdot}89_{22}$	$12{\cdot}19_{21}$	$12{\cdot}29_{36}$	$12{\cdot}11_{80}$	−·07	+·04	−·1
	t	+0·1	−0·8	12·5	$12{\cdot}20_{6}$	$12{\cdot}67_{20}$	$12{\cdot}88_{21}$	$12{\cdot}65_{47}$	−·12	+·03	−·1
T Ursæ Majoris	1*e*	+6·0	+0·2	7·6	$7{\cdot}36_{16}$	$7{\cdot}43_{7}$	$7{\cdot}78_{15}$	$7{\cdot}55_{38}$	+·20	+·15	+·1
	2*f*	+4·2	+3·0	7·9	$7{\cdot}58_{11}$	$7{\cdot}94_{12}$	$7{\cdot}98_{19}$	$7{\cdot}81_{42}$	+·18	+·09	·0
	3	+5·8	+2·1	8·7	$8{\cdot}40_{4}$	$8{\cdot}58_{8}$	$8{\cdot}86_{29}$	$8{\cdot}58_{41}$	+·17	+·05	·0
	4*g*	+1·3	−3·2	8·7	$8{\cdot}50_{5}$	$8{\cdot}54_{5}$	$8{\cdot}85_{26}$	$8{\cdot}58_{36}$	+·17	+·05	·0
	5*k*	+2·9	+2·2	9·3	$9{\cdot}22_{9}$	$9{\cdot}60_{2}$	$9{\cdot}67_{19}$	$9{\cdot}43_{31}$	+·09	+·22	+·1
	6*h*	−3·6	+2·8	9·4	$8{\cdot}56_{6}$	...	$9{\cdot}07_{27}$	$8{\cdot}79_{33}$	+·17	−·44	−·5
	8*l*	+2·9	+1·4	10·4	$9{\cdot}99_{12}$	$10{\cdot}00_{2}$	$10{\cdot}68_{10}$	$10{\cdot}31_{24}$	−·01	−·10	−·3
	9*m*	+3·6	+0·1	10·3	$9{\cdot}95_{9}$	$10{\cdot}27_{3}$	$10{\cdot}42_{14}$	$10{\cdot}18_{26}$	−·01	−·13	−·3
	11	+4·0	+3·9	11·0	$10{\cdot}46_{8}$	$10{\cdot}70_{2}$	$11{\cdot}05_{2}$	$10{\cdot}70_{12}$	−·09	−·39	−·6
	12	+4·4	+2·3	11·2	$11{\cdot}07_{6}$	$11{\cdot}02_{5}$	$11{\cdot}20_{2}$	$11{\cdot}13_{13}$	−·09	−·16	−·4
	13	+2·8	−3·0	10·4	$10{\cdot}11_{13}$	$10{\cdot}10_{2}$	$10{\cdot}63_{6}$	$10{\cdot}35_{22}$	−·04	−·09	−·2
	14*q*	−0·8	+0·5	11·5	$11{\cdot}63_{6}$	$11{\cdot}85_{9}$	$11{\cdot}97_{14}$	$11{\cdot}80_{29}$	−·09	+·21	+·1
	15*o*	+3·1	−1·9	10·8	$10{\cdot}93_{12}$	$11{\cdot}20_{6}$	$11{\cdot}27_{4}$	$11{\cdot}13_{22}$	−·08	+·25	+·2
	16*n*	+2·0	−2·0	11·2	$10{\cdot}93_{12}$	$11{\cdot}07_{6}$	$11{\cdot}10_{2}$	$11{\cdot}08_{21}$	−·06	−·18	−·2
	17	+1·2	−0·9	11·6	$11{\cdot}68_{6}$	$12{\cdot}00_{7}$	$11{\cdot}94_{7}$	$11{\cdot}88_{20}$	−·08	+·20	+·2
	7	+2·8	+6·9	9·2	...	...	...	...	...	...	...
	10	+2·9	+6·4	10·8	...	...	...	...	...	...	...
	e	+6·0	+0·2	8·0	$7{\cdot}51_{28}$	$7{\cdot}91_{15}$	$8{\cdot}11_{26}$	$7\ 82_{87}$	+·15	−·03	−·1
	f	+4·2	+3·0	8·3	$7{\cdot}85_{23}$	$8{\cdot}13_{16}$	$8{\cdot}40_{44}$	$8{\cdot}13_{83}$	+·14	−·03	−·1

TABLE XI.—*continued.*

Variable.	Number or Letter.	Peek Coords.		Adopted Mag.	Inferred Magnitude.				Correction for Scale.	Inferred Correction.	Adopted Correction.
		x	y		−2·0 to −0·5	−0·4 to +0·4	+0·5 to +2·0	Mean.			
T Ursæ Majoris—*cont.*	g	+1·3	−3·2	8·8	$8{\cdot}74_{10}$	$8{\cdot}94_{10}$	$9{\cdot}07_{64}$	$8{\cdot}87_{88}$	+·14	+·21	+·2
	h	−3·6	+2·8	9·2	$9{\cdot}03_{28}$	$9{\cdot}19_{16}$	$9{\cdot}18_{61}$	$9{\cdot}07_{105}$	+·12	−·01	·0
	k	+2·9	+2·2	9·8	$9{\cdot}64_{28}$	$9{\cdot}89_{11}$	$9{\cdot}86_{60}$	$9{\cdot}71_{86}$	+·08	−·01	·0
	l	+2·9	+1·4	10·4	$10{\cdot}55_{24}$	$10{\cdot}68_{15}$	$10{\cdot}69_{27}$	$10{\cdot}64_{76}$	−·03	+·21	+·2
	m	+3·6	+0·1	10·7	$10{\cdot}65_{27}$	$10{\cdot}71_{26}$	$10{\cdot}91_{15}$	$10{\cdot}77_{72}$	−·03	+·04	·0
	n	+2·0	−2·0	11·3	$11{\cdot}33_{20}$	$11{\cdot}52_{6}$	$11{\cdot}75_{4}$	$11{\cdot}50_{30}$	−·05	+·15	+·1
	o	+3·1	−1·9	11·7	$11{\cdot}36_{14}$	$11{\cdot}70_{8}$	...	$11{\cdot}57_{22}$	−·05	−·18	−·3
	q	−0·8	+0·5	12·3	$12{\cdot}17_{10}$	$12{\cdot}29_{14}$	$12{\cdot}39_{29}$	$12{\cdot}30_{53}$	−·06	−·06	−·1
	r	+1·2	−0·9	12·4	$12{\cdot}23_{15}$	$12{\cdot}59_{10}$	$12{\cdot}41_{24}$	$12{\cdot}40_{49}$	−·06	−·06	−·1
S Ursæ Majoris	1a	−1·1	+0·8	6·0	$6{\cdot}20_{10}$	...	...	$6{\cdot}50_{10}$	−·09	+·41	+·4*
	2c	−7·3	−1·0	7·4	$6{\cdot}92_{41}$	$7{\cdot}43_{4}$	...	$7{\cdot}24_{45}$	+·01	−·15	−·2
	3b	−6·5	−2·5	7·0	$6{\cdot}73_{47}$	...	...	$7{\cdot}03_{47}$	+·01	+·04	·0
	4f	−4·6	−3·4	8·6	$8{\cdot}09_{7}$	$8{\cdot}59_{7}$	$8{\cdot}87_{29}$	$8{\cdot}53_{84}$	+·04	−·03	−·1
	5g	−2·8	−2·6	9·0	$8{\cdot}49_{7}$	$8{\cdot}96_{8}$	$9{\cdot}33_{40}$	$8{\cdot}99_{55}$	+·04	+·03	·0
	6	+1·1	−7·0	9·1	$8{\cdot}75_{8}$	$8{\cdot}85_{2}$	$9{\cdot}40_{45}$	$9{\cdot}09_{55}$	+·07	+·06	·0
	10	−5·3	+1·0	10·5	$10{\cdot}73_{10}$	$11{\cdot}03_{9}$	$10{\cdot}93_{12}$	$10{\cdot}89_{27}$	−·04	+·35	+·3
	11	−3·4	+2·7	10·8	$10{\cdot}48_{10}$	$10{\cdot}70_{6}$	$10{\cdot}67_{14}$	$10{\cdot}62_{30}$	−·03	−·21	−·3
	12m	+0·9	−1·1	10·9	$10{\cdot}83_{16}$	$11{\cdot}15_{16}$	$11{\cdot}12_{13}$	$11{\cdot}04_{45}$	−·11	+·03	·0
	13l	+2·4	+0·6	10·1	$10{\cdot}28_{10}$	$10{\cdot}30_{7}$	$10{\cdot}52_{6}$	$10{\cdot}41_{23}$	−·08	+·23	+·2
	14	+0·8	−6·0	10·5	$9{\cdot}95_{6}$	$10{\cdot}00_{1}$	$10{\cdot}33_{6}$	$10{\cdot}15_{13}$	−·06	−·41	−·5
	15k	+0·6	−4·9	9·8	$9{\cdot}66_{11}$	$9{\cdot}90_{3}$	$10{\cdot}08_{10}$	$9{\cdot}88_{24}$	+·01	+·09	+·1
	16	+1·7	−4·9	10·1	$9{\cdot}86_{9}$	$10{\cdot}20_{3}$	$10{\cdot}21_{9}$	$10{\cdot}57_{21}$	+·01	+·48	+·5
	17	+2·5	−5·2	9·9	$9{\cdot}90_{7}$	...	$10{\cdot}03_{3}$	$10{\cdot}02_{10}$	−·05	+·07	+·1
	21	−0·9	+2·0	11·3	$10{\cdot}93_{10}$	$11{\cdot}07_{7}$	$11{\cdot}20_{1}$	$11{\cdot}10_{18}$	−·16	−·36	−·5
	7k	−8·2	−5·4	10·1	...	...	...	...	...	...	...
	8	−8·0	−2·0	10·4	...	...	...	...	...	...	...
	9	−7·4	−1·3	10·3	...	...	...	...	...	...	...
	18n	+1·6	+1·2	10·9	...	...	...	...	...	...	...
	22	−2·2	−1·2	12·5	...	...	...	...	...	...	...
	a	−1·1	+0·8	6·6	$6{\cdot}39_{47}$	...	...	$6{\cdot}64_{47}$	−·02	+·02	·0
	b	−6·5	−2·5	7·0	$6{\cdot}90_{112}$	...	...	$7{\cdot}15_{112}$	−·02	+·13	+·1
	c	−7·3	−1·0	7·3	$7{\cdot}19_{99}$	$7{\cdot}48_{8}$	...	$7{\cdot}43_{107}$	+·01	+·14	+·1
	f	−4·6	−3·4	8·5	$8{\cdot}24_{44}$	$8{\cdot}41_{26}$	$8{\cdot}89_{62}$	$8{\cdot}55_{130}$	+·02	+·07	·0
	g	−2·8	−2·6	8·8	$8{\cdot}81_{41}$	$8{\cdot}88_{20}$	$9{\cdot}23_{85}$	$8{\cdot}98_{146}$	+·02	+·20	+·1
	k	+0·6	−4·9	9·7	$9{\cdot}45_{20}$	$9{\cdot}63_{14}$	$9{\cdot}92_{41}$	$9{\cdot}68_{86}$	+·04	+·02	−·1
	l	+2·4	+0·6	10·1	$9{\cdot}93_{62}$	$10{\cdot}00_{14}$	$10{\cdot}18_{56}$	$10{\cdot}05_{132}$	+·01	−·04	−·2
	m	+0·9	−1·1	10·6	$10{\cdot}77_{25}$	$10{\cdot}95_{27}$	$10{\cdot}79_{76}$	$10{\cdot}76_{130}$	+·01	+·17	·0
	n	+1·6	+1·2	11·1	$10{\cdot}78_{10}$	$10{\cdot}95_{15}$	$11{\cdot}01_{21}$	$10{\cdot}92_{34}$	−·03	−·21	−·5
	o	+1·6	−1·2	11·6	$11{\cdot}60_{1}$	$11{\cdot}91_{25}$	$11{\cdot}92_{17}$	$11{\cdot}84_{28}$	−·05	+·19	−·1
	p	+2·2	−1·5	11·9	$11{\cdot}42_{5}$	$11{\cdot}78_{10}$	$12{\cdot}01_{18}$	$11{\cdot}81_{28}$	−·04	−·13	−·4
	h	−8·2	−5·4	9·2	...	...	...	...	...	...	...
	r	−3·0	−0·1	13·1	...	...	...	...	...	...	...
S Boötis	1a	−1·5	−2·9	7·6	$7{\cdot}40_{15}$	...	...	$7{\cdot}70_{15}$	+·05	+·15	+·1
	2	+3·8	−2·6	7·3	$7{\cdot}19_{12}$	...	...	$7{\cdot}49_{12}$	+·04	+·23	+·2
	3c	+4·6	−0·8	8·5	$8{\cdot}12_{20}$	$8{\cdot}58_{5}$	$9{\cdot}10_{3}$	$8{\cdot}49_{29}$	+·10	+·09	·0
	5f	+2·4	−3·7	10·0	$9{\cdot}05_{2}$	$9{\cdot}72_{8}$	$10{\cdot}08_{19}$	$9{\cdot}73_{29}$	+·12	−·15	−·2
	6	+1·5	−4·9	10·1	$9{\cdot}83_{6}$	$9{\cdot}70_{3}$	$10{\cdot}35_{14}$	$10{\cdot}06_{20}$	+·13	+·09	·0
	7	+1·0	−1·0	10·7	$10{\cdot}34_{7}$	$10{\cdot}49_{7}$	$10{\cdot}72_{23}$	$10{\cdot}51_{37}$	+·07	−·12	−·2

* By an error, only discovered after the observations had been printed off, the number for column 6 should be 6·01 instead of 6·20. The adopted correction should thus have been +·2 instead of +·4.

Table XI.—*continued.*

Variable.	Number or Letter.	Peek Coords.		Adopted Mag.	Inferred Magnitude.				Correction for Scale.	Inferred Correction.	Adopted Correction.
		x	*y*		−2·0 to −0·5	−0·4 to +0·4	+0·5 to +2·0	Mean.			
S Boötis—*cont.*	8*h*	−1·1	+1·4	10·5	$10{\cdot}40_{7}$	$10{\cdot}85_{2}$	$10{\cdot}78_{24}$	$10{\cdot}61_{33}$	+·04	+·15	+·1
	10	+0·1	+0·9	11·5	$11{\cdot}20_{2}$	$11{\cdot}73_{3}$	$11{\cdot}80_{5}$	$11{\cdot}60_{10}$	−·07	+·03	·0
	20	+1·0	−2·8	10·1	$9{\cdot}93_{6}$	$10{\cdot}25_{4}$	$10{\cdot}40_{9}$	$10{\cdot}18_{21}$	+·05	+·13	+·1
	21	+0·5	−3·0	10·5	$10{\cdot}08_{6}$	$10{\cdot}90_{3}$	$10{\cdot}66_{5}$	$10{\cdot}44_{19}$	+·02	−·04	−·1
	9	−3·3	−0·4	10·0	...	...	...	...	...	...	...
	14	+3·2	−1·2	11·6	...	...	...	...	...	...	...
	15	+2·7	−0·7	11·2	...	...	...	...	...	...	...
	25	−1·6	−4·8	11·1	...	...	...	...	...	...	...
	27*n*	+0·4	−0·6	12·1	...	...	...	...	...	...	...
	28	−0·7	+0·5	12·0	...	...	...	...	...	...	...
	a	−1·5	−2·9	7·4	$7{\cdot}35_{70}$	...	...	$7{\cdot}60_{70}$	+·04	+·24	+·3
	c	+4·6	−0·8	8·4	$8{\cdot}14_{72}$	$8{\cdot}47_{18}$	$8{\cdot}73_{4}$	$8{\cdot}41_{86}$	+·01	+·02	·0
	f	+2·4	−3·7	9·7	$9{\cdot}49_{27}$	$9{\cdot}65_{18}$	$9{\cdot}97_{63}$	$9{\cdot}73_{110}$	·00	+·03	·0
	g	+0·3	−2·5	10·2	$10{\cdot}22_{42}$	$10{\cdot}26_{14}$	$10{\cdot}41_{82}$	$10{\cdot}28_{138}$	·00	+·08	+·1
	h	−1·1	+1·4	10·6	$10{\cdot}70_{22}$	$10{\cdot}60_{16}$	$10{\cdot}76_{78}$	$10{\cdot}68_{127}$	·00	+·08	+·1
	m	+0·1	+0·9	12·0	$11{\cdot}64_{13}$	$11{\cdot}81_{18}$	$12{\cdot}14_{23}$	$11{\cdot}91_{54}$	−·07	−·16	−·2
	n	+0·4	−0·6	12·5	$12{\cdot}01_{2}$	$12{\cdot}44_{11}$	$12{\cdot}52_{9}$	$12{\cdot}39_{22}$	−·10	−·21	−·3
	b	+7·8	−6·0	7·9	...	...	...	...	...	...	...
	e	+3·3	−9·0	9·1	...	...	...	...	...	...	...
	p	−0·8	+1·8	13·3	...	...	...	...	...	...	...
	q	−0·4	+0·9	13·6	...	...	...	...	...	...	...
	r	+0·1	−0·7	13·9	...	...	...	...	...	...	...
	s	+0·5	+0·7	14·3	...	...	...	...	...	...	...
R Camelopardi	1*b*	−1·0	+1·5	7·1	$7{\cdot}31_{20}$	$7{\cdot}52_{5}$	$7{\cdot}78_{5}$	$7{\cdot}57_{30}$	+·17	+·64	+·7
	2*e*	+1·4	+3·1	9·4	$8{\cdot}84_{10}$	$9{\cdot}05_{6}$	$9{\cdot}23_{25}$	$9{\cdot}00_{41}$	+·13	−·27	−·2
	3*c*	+2·5	−1·1	8·7	$8{\cdot}19_{14}$	$8{\cdot}54_{7}$	$8{\cdot}74_{29}$	$8{\cdot}48_{41}$	+·14	−·08	·0
	8*h*	+1·0	+1·2	10·7	$10{\cdot}60_{6}$	...	$10{\cdot}85_{17}$	$10{\cdot}70_{23}$	+·02	+·02	·0
	9*g*	+1·9	−0·4	10·4	$10{\cdot}25_{9}$	$10{\cdot}15_{2}$	$10{\cdot}50_{17}$	$10{\cdot}33_{28}$	+·07	·00	·0
	11	−0·3	+0·9	10·4	$10{\cdot}54_{5}$	...	$10{\cdot}63_{24}$	$10{\cdot}49_{29}$	+·07	+·16	+·2
	4	−4·0	+6·3	9·9	...	...	...	...	...	...	...
	7	−4·6	−3·9	9·8	...	...	...	...	...	...	...
	10	−2·0	+3·7	10·2	...	...	...	...	...	...	...
	12	−4·0	+0·5	10·4	...	...	...	...	...	...	...
	15	−3·4	0·0	11·2	...	...	...	...	...	...	...
	17*k*	−1·8	+2·3	11·6	...	...	...	...	...	...	...
	18	−1·0	+2·7	11·3	...	...	...	...	...	...	...
	19*m*	−0·5	−0·1	12·3	...	...	...	...	...	...	...
	20	−0·5	+3·0	11·2	...	...	...	...	...	...	...
	b	−1·0	+1·5	8·4	$7{\cdot}86_{32}$	$8{\cdot}31_{22}$	$8{\cdot}56_{18}$	$8{\cdot}17_{113}$	+·10	−·13	−·1
	c	+2·5	−1·1	9·0	$8{\cdot}82_{42}$	$9{\cdot}18_{30}$	$9{\cdot}46_{60}$	$9{\cdot}16_{132}$	+·08	+·24	+·3
	e	+1·4	+3·1	9·8	$9{\cdot}67_{24}$	$9{\cdot}70_{19}$	$9{\cdot}94_{80}$	$9{\cdot}76_{143}$	+·08	+·04	+·1
	g	+1·9	−0·4	10·8	$10{\cdot}55_{26}$	$10{\cdot}76_{9}$	$10{\cdot}83_{95}$	$10{\cdot}69_{130}$	+·09	−·02	·0
	h	+1·0	+1·2	11·2	$11{\cdot}07_{23}$	$11{\cdot}24_{5}$	$11{\cdot}14_{70}$	$11{\cdot}05_{98}$	+·09	−·06	·0
	k	−1·8	+2·3	11·8	$11{\cdot}95_{4}$	$12{\cdot}15_{2}$	$12{\cdot}27_{3}$	$12{\cdot}12_{9}$	−·12	+·20	+·3
	m	−0·5	−0·1	12·7	...	$12{\cdot}93_{4}$	$13{\cdot}15_{11}$	$12{\cdot}98_{15}$	−·11	+·17	+·3
	a	+11·0	+1·4	7·9	...	...	...	...	...	...	...
	l	+1·9	+0·7	12·2	...	...	...	...	...	...	...

TABLE XI.—*continued.*

Variable.	Number or Letter.	Peek Coords.		Adopted Mag.	Inferred Magnitude.				Correction for Scale.	Inferred Correction.	Adopted Correction.
		x	*y*		−2·0 to −0·5.	−0·4 to +0·4.	+0·5 to +2·0.	Mean.			
S Coronæ ...	1	−4·2	+5·9	9·0	$8{\cdot}62_{17}$	$9{\cdot}02_{15}$	$9{\cdot}35_{79}$	$9{\cdot}28_{111}$	+·10	+·38	+·2
	2	−3·4	+2·9	11 0	$11{\cdot}05_{11}$	$11{\cdot}09_{7}$	$11{\cdot}13_{3}$	$11{\cdot}15_{21}$	−·11	+·10	+·3
	3	−1·2	+1·3	7 5	$6{\cdot}86_{77}$	$7{\cdot}39_{7}$	$7{\cdot}58_{6}$	$7{\cdot}18_{92}$	+·12	−·20	−·5
	4	−0·6	−5·2	9·1	$8{\cdot}84_{11}$	$9{\cdot}12_{5}$	$9{\cdot}64_{22}$	$9{\cdot}28_{38}$	+·08	+·26	+·1
	6	−2·3	+5·0	10·5	$10{\cdot}52_{9}$	$10{\cdot}66_{9}$	$10{\cdot}57_{3}$	$10{\cdot}50_{21}$	−·02	+·16	+·4
	8	−0·4	+0·7	10·9	$11{\cdot}01_{27}$	$10{\cdot}98_{17}$	$11{\cdot}17_{16}$	$11{\cdot}06_{60}$	−·02	+·14	+·3
	10	+0·5	−0·7	10·1	$9{\cdot}81_{85}$	$10{\cdot}04_{11}$	$10{\cdot}49_{23}$	$10{\cdot}09_{119}$	·00	−·01	·0
	12	+1·1	−5·5	9·5	$8{\cdot}55_{12}$	$8{\cdot}93_{3}$	$9{\cdot}61_{52}$	$9{\cdot}28_{67}$	+·11	−·18	−·4
	15	+2·9	+4·4	9·9	$9{\cdot}95_{44}$	$9{\cdot}93_{13}$	$10{\cdot}33_{28}$	$10{\cdot}18_{85}$	·00	+·28	+·4
	16	+3·6	+4·0	10·7	$10{\cdot}93_{60}$	$10{\cdot}89_{17}$	$11{\cdot}03_{27}$	$10{\cdot}97_{74}$	−·03	+·24	+·4
	17	+4·1	+2·3	9·0	$8{\cdot}32_{35}$	$8{\cdot}79_{14}$	$8{\cdot}98_{90}$	$8{\cdot}71_{139}$	+·08	−·21	−·4
	18	+5·6	+5·4	8·4	$7{\cdot}87_{40}$	$8{\cdot}30_{22}$	$8{\cdot}61_{75}$	$8{\cdot}26_{137}$	+·08	−·06	−·3
	34	+1·3	−0·5	12·0	$11{\cdot}56_{8}$	$11{\cdot}63_{3}$	$11{\cdot}70_{2}$	$11{\cdot}66_{10}$	−·04	−·38	−·3
	5	−0·7	−5·1	11·0	...	...	...	...	...	...	....
	7	−1·6	+2·8	11·0	...	...	...	...	...	...	...
	9	+0·2	+6·0	10·8	...	...	...	...	...	...	...
	11	+1·5	−3·8	11·0	...	...	...	...	...	...	...
	13	+2·6	−4·2	10·9	...	...	...	...	...	...	...
	14	+3·5	−4·3	10·8	...	...	...	...	...	...	...
	21	−1·7	+0·4	11·3	...	...	...	...	...	...	...
	35	+1·7	−1·0	10·9	...	...	...	...	...	...	...
	36	+1·3	+0·6	12 0	...	...	...	...	...	...	...
	37	+0·1	−1·7	12·0	...	...	...	...	...	...	...
R Ursæ Minoris	*a*	−0·2	+8·0	8·2	$8{\cdot}10_{180}$	...	...	$8{\cdot}35_{180}$	−·05	+·10	·0
	b	+3·9	−3·6	8·6	$8{\cdot}44_{66}$	$8\,74_{5}$	...	$8{\cdot}68_{91}$	−·06	+·02	−·1
	c	+3·1	+7·7	8·9	$8{\cdot}84_{63}$	$9{\cdot}16_{40}$	$9{\cdot}85_{2}$	$9{\cdot}13_{110}$	−·07	+·16	+·1
	d	+2·0	+2·9	9·3	$8{\cdot}92_{29}$	$9{\cdot}31_{84}$	$9{\cdot}79_{9}$	$9{\cdot}28_{122}$	−·05	−·07	·0
	f	−2·7	+6·3	10·0	$9{\cdot}45_{2}$	$9{\cdot}86_{42}$	$10{\cdot}18_{111}$	$9{\cdot}95_{155}$	−·05	−·10	−·2
	g	+2·7	+4·7	10·3	$9{\cdot}80_{1}$	$9{\cdot}80_{4}$	$10{\cdot}40_{49}$	$10{\cdot}21_{53}$	·00	−·09	−·2
	h	+2·1	−1·5	10·7	...	...	$10{\cdot}94_{27}$	$10{\cdot}79_{27}$	−·03	+·06	·0
	k	+3·6	−1·8	11·0	...	...	$10{\cdot}99_{17}$	$10{\cdot}84_{17}$	−·03	−·19	−·3
	e	+1·6	+2·4	9·6	...	...	...	...	...	...	...
R Draconis ...	1*a*	−5·3	+3·4	6·7	$6{\cdot}18_{16}$	$6{\cdot}00_{1}$	...	$6{\cdot}45_{17}$	+·14	−·11	−·3
	2	−8·9	+3·7	7·5	$6{\cdot}81_{17}$	$7{\cdot}30_{4}$	$7{\cdot}62_{6}$	$7{\cdot}18_{27}$	+·15	−·17	−·4
	3*f*	+1·0	−0·3	8·4	$7{\cdot}62_{16}$	$7{\cdot}97_{6}$	$8{\cdot}45_{21}$	$8{\cdot}04_{43}$	+·11	−·25	−·4
	6*k*	−1·7	−0·5	8·8	$8{\cdot}80_{10}$	$9{\cdot}03_{7}$	$9{\cdot}30_{29}$	$9{\cdot}02_{46}$	+·09	+·31	+·2
	7*m*	−1·0	+2·1	9·9	$9{\cdot}53_{9}$	$9{\cdot}87_{7}$	$9{\cdot}97_{21}$	$9{\cdot}75_{37}$	+·07	−·08	−·2
	9*h*	−3·6	+0·7	8·7	$8{\cdot}55_{8}$	$8{\cdot}96_{7}$	$9{\cdot}07_{24}$	$8{\cdot}83_{39}$	+·10	+·23	+·1
	17*q*	+0·1	−0·8	11·9	$11{\cdot}80_{1}$	$11{\cdot}89_{7}$	$12{\cdot}14_{9}$	$11{\cdot}92_{17}$	−·07	−·05	+·1*
	20	+1·5	−1·8	9·7	$9{\cdot}89_{8}$	$10{\cdot}58_{4}$	$10{\cdot}28_{9}$	$10{\cdot}08_{21}$	−·01	+·41	+·4
	21*n*	+0·5	−2·1	10·7	$10{\cdot}58_{11}$	$10{\cdot}48_{5}$	$10{\cdot}94_{5}$	$10{\cdot}73_{21}$	−·07	−·04	−·1
	22*o*	−0·4	−2·2	10·9	$11{\cdot}25_{6}$	$11{\cdot}44_{5}$	$11{\cdot}34_{7}$	$11{\cdot}33_{18}$	−·07	+·36	+·3
	4	−2·5	+7·1	8·0	...	...	...	...	...	...	...
	5	−3·2	+0·3	11·0	...	...	...	...	...	...	...
	8	−0·5	+6·0	9·3	...	...	...	...	...	...	...
	11	−4·1	+5·2	10·1	...	...	...	...	...	...	...
	13	−2·0	+5·9	11·1	...	...	...	...	...	...	...
	15	−4·0	+0·8	11·3	...	...	...	...	...	...	...

* By an error, only discovered after the observations had been printed off, +·19 was used in the preceding column. The adopted correction should therefore have been −·1 instead of +·1.

TABLE XI.—*continued.*

Variable.	Number or Letter.	Peek Coords.		Adopted Mag.	Inferred Magnitude.				Correction for Scale.	Inferred Correction.	Adopted Correction.
		x	y		−2·0 to −0·5	−0·4 to +0·4	+0·5 to +2·0	Mean.			
R Draconis—*cont.*	16	−3·7	+2·4	10·4	...	...	...	...	...	...	...
	18	−2·7	−0·1	11·8	...	...	...	...	...	...	...
	19	−2·2	0·0	12·1	...	...	...	...	...	...	...
	a	−5·3	+3·4	6·9	$6{\cdot}37_{72}$	$7{\cdot}12_{4}$	$7{\cdot}50_{1}$	$6{\cdot}65_{77}$	+·12	−·13	−·1
	f	+1·0	−0·3	8·3	$7{\cdot}84_{41}$	$8{\cdot}12_{13}$	$8{\cdot}62_{32}$	$8{\cdot}24_{106}$	+·06	·00	·0
	g	−2·1	+7·0	8·6	$8{\cdot}30_{22}$	$8{\cdot}51_{13}$	$8{\cdot}91_{37}$	$8{\cdot}62_{72}$	+·07	+·09	+·1
	h	−3·6	+0·7	9·1	$8{\cdot}90_{46}$	$9{\cdot}22_{13}$	$9{\cdot}34_{69}$	$9{\cdot}12_{127}$	+·03	+·05	+·1
	k	−1·7	−0·5	9·4	$9{\cdot}18_{15}$	$9{\cdot}38_{15}$	$9{\cdot}54_{70}$	$9{\cdot}35_{100}$	+·03	−·02	·0
	n	+0·5	−2·1	10·7	$10{\cdot}57_{28}$	$10{\cdot}73_{11}$	$11{\cdot}05_{26}$	$10{\cdot}80_{75}$	−·05	+·05	+·2
	o	−0·4	−2·2	11·0	$11{\cdot}36_{16}$	$11{\cdot}33_{17}$	$11{\cdot}53_{29}$	$11{\cdot}41_{64}$	−·05	+·36	+·5
	q	+0·1	−0·8	12·0	$11{\cdot}70_{9}$	$11{\cdot}84_{10}$	$11{\cdot}95_{27}$	$11{\cdot}95_{86}$	−·05	−·10	·0
	l	−2·1	+5·6	9·8	...	...	...	...	...	...	...
	m	−1·0	+2·1	10·2	...	...	...	...	...	...	...
	p	+2·0	+0·1	11·6	...	...	...	...	...	...	...
	r	+2·1	+0·1	12·5	...	...	...	...	...	...	...
	t	+2·0	+0·5	13·3	...	...	...	...	...	...	...
	u	+0·2	−0·1	13·8	...	...	...	...	...	...	...
S Herculis ...	1	+0·7	+0·4	6·3	$5{\cdot}90_{60}$	...	...	$6{\cdot}20_{60}$	+·11	+·01	−·1
	3	+4·7	+5·8	8·0	$7{\cdot}29_{11}$	$7{\cdot}67_{9}$	$7{\cdot}95_{21}$	$7{\cdot}66_{41}$	+·12	−·20	−·4
	4	+5·4	+2·5	8·2	$7{\cdot}81_{41}$	$8{\cdot}01_{18}$	$8{\cdot}23_{40}$	$8{\cdot}01_{100}$	+·09	−·10	−·2
	5	+3·5	−0·7	8·4	$8{\cdot}15_{60}$	$8{\cdot}41_{23}$	$8{\cdot}56_{54}$	$8{\cdot}36_{130}$	+·06	+·02	·0
	6	−2·8	−0·8	8·8	$8{\cdot}47_{46}$	$8{\cdot}85_{28}$	$9{\cdot}04_{68}$	$8{\cdot}78_{142}$	+·05	+·03	·0
	7	+6·0	+1·5	9·0	$8{\cdot}78_{87}$	$9{\cdot}15_{28}$	$9{\cdot}15_{72}$	$8{\cdot}96_{192}$	+·05	+·01	·0
	8	+0·6	−0·4	9·8	$10{\cdot}00_{44}$	$10{\cdot}19_{15}$	$10{\cdot}42_{60}$	$10{\cdot}21_{122}$	−·01	+·40	+·6
	9	+0·9	−1·9	9·7	$9{\cdot}88_{22}$	$9{\cdot}98_{21}$	$10{\cdot}17_{22}$	$10{\cdot}01_{75}$	−·02	+·29	+·5
	11	+4·8	+0·5	10·0	$9{\cdot}96_{20}$	$10{\cdot}12_{10}$	$10{\cdot}39_{54}$	$10{\cdot}18_{108}$	−·03	+·15	+·3
	17	+2·0	−2·3	10·6	$10{\cdot}38_{4}$	$10{\cdot}72_{5}$	$11{\cdot}50_{1}$	$10{\cdot}72_{10}$	−·08	+·04	+·4
	18	+1·2	−1·5	10·6	$10{\cdot}56_{7}$	$10{\cdot}67_{2}$	...	$10{\cdot}73_{10}$	−·11	+·02	+·3
	19	+0·2	+1·6	10·5	$10{\cdot}36_{21}$	$10{\cdot}30_{7}$	$10{\cdot}75_{4}$	$10{\cdot}55_{42}$	−·11	−·06	+·1
	24	+0·9	−1·0	11·3	$11{\cdot}29_{3}$	$11{\cdot}42_{14}$	$11{\cdot}35_{4}$	$11{\cdot}40_{20}$	−·11	−·01	+·2
	25	+1·3	−2·6	10·9	$11{\cdot}18_{6}$	$11{\cdot}12_{6}$	$10{\cdot}70_{1}$	$11{\cdot}20_{13}$	−·11	+·19	+·5
	29	+1·0	+1·4	11·9	$11{\cdot}66_{3}$	$11{\cdot}97_{3}$	$12{\cdot}10_{1}$	$11{\cdot}89_{12}$	−·12	−·13	−·2
	2	−4·6	+6·0	7·8	...	...	...	...	...	...	...
	10	−0·2	−4·3	9·7	...	...	...	...	...	...	...
	12	−0·2	+5·0	9·8	...	...	...	...	...	...	...
	14	+5·0	+0·8	10·7	...	...	...	...	...	...	...
	15	+1·2	+4·0	10·5	...	...	...	...	...	...	...
	21	−0·6	−3·3	9·6	...	...	...	...	...	...	...
	26	+0·3	+1·3	12·6	...	...	...	...	...	...	...
	27	+1·0	+1·2	12·3	...	...	...	...	...	...	...
	28	+1·6	+1·4	12·1	...	...	...	...	...	...	...
T Draconis ...	*a*	+3·9	+6·7	7·8	$7{\cdot}44_{64}$	...	...	$7{\cdot}69_{64}$	+·04	−·07	−·1
	b	−2·0	+6·8	8·5	$8{\cdot}48_{22}$	$8{\cdot}62_{9}$	$9{\cdot}13_{22}$	$8{\cdot}76_{62}$	+·04	+·30	+·3
	c	+2·7	+3·6	9·2	$8{\cdot}99_{42}$	$9{\cdot}20_{11}$	$9{\cdot}46_{41}$	$9{\cdot}23_{100}$	+·03	+·06	·0
	d	+3·3	+3·5	10·0	$10{\cdot}03_{15}$	$10{\cdot}01_{24}$	$10{\cdot}30_{61}$	$10{\cdot}10_{100}$	+·03	+·13	+·1
	e	−0·2	−0·2	10·8	$10{\cdot}57_{7}$	$10{\cdot}75_{4}$	$10{\cdot}88_{60}$	$10{\cdot}73_{74}$	·00	−·07	−·1
	f	−1·5	−0·5	10·5	$10{\cdot}83_{3}$	$10{\cdot}98_{5}$	$10{\cdot}92_{21}$	$10{\cdot}83_{29}$	+·05	+·38	+·4
	g	−1·7	−0·9	11·5	$11{\cdot}10_{1}$	$11{\cdot}22_{2}$	$11{\cdot}51_{12}$	$11{\cdot}31_{15}$	+·02	−·17	−·2

Table XI.—*continued.*

Variable.	Number or Letter.	Peek Coords.		Adopted Mag.	Inferred Magnitude.				Correction for Scale.	Inferred Correction.	Adopted Correction.
		x	y		−2·0 to −0·5	−0·4 to +0·4	+0·5 to +2·0	Mean.			
R Cygni ...	1	−0·9	0·0	5·4	$5{\cdot}83_{10}$	...	...	$6{\cdot}13_{10}$	+·06	+·79	+1·0
	2	−2·2	+0·7	7·1	$7{\cdot}03_{78}$	$7{\cdot}12_{5}$	...	$7{\cdot}32_{88}$	+·09	+·31	+·3
	3	−4·5	+1·4	8·8	$8{\cdot}76_{88}$	$8{\cdot}84_{22}$	$8{\cdot}94_{10}$	$8{\cdot}84_{107}$	+·06	+·08	·0
	4	−3·7	+4·8	8·5	$8{\cdot}21_{16}$	$8{\cdot}34_{10}$	$8{\cdot}72_{30}$	$8{\cdot}43_{52}$	+·10	+·03	·0
	5	+3·7	−1·5	9·3	$9{\cdot}07_{20}$	$9{\cdot}26_{12}$	$9{\cdot}41_{40}$	$9{\cdot}22_{92}$	+·05	−·03	−·1
	6	+4·5	+0·3	9·1	$8{\cdot}60_{14}$	$8{\cdot}88_{10}$	$9{\cdot}07_{33}$	$9{\cdot}02_{57}$	+·08	−·20	−·3
	7	+5·2	+1·8	9·4	$9{\cdot}09_{16}$	$9{\cdot}23_{6}$	$9{\cdot}35_{29}$	$9{\cdot}18_{52}$	+·07	−·15	−·3
	10	+0·1	+0·6	9·8	$9{\cdot}63_{21}$	$9{\cdot}90_{17}$	$9{\cdot}87_{80}$	$9{\cdot}71_{117}$	+·03	−·06	−·2
	11	−0·5	−1·6	11·1	$10{\cdot}84_{12}$	$10\,93_{12}$	$11{\cdot}02_{46}$	$10{\cdot}87_{70}$	−·01	−·24	−·4
	13	−1·5	−1·0	11·7	$11{\cdot}36_{7}$	$11{\cdot}62_{5}$	$11{\cdot}91_{10}$	$11{\cdot}66_{20}$	·00	−·04	−·2
	14	−1·6	−0·2	11·5	$11{\cdot}54_{9}$	$10{\cdot}60_{3}$	$11{\cdot}86_{21}$	$11{\cdot}64_{33}$	·00	+·14	·0
	8	−6·8	0·0	9·8	...	...	...	...	...	...	...
	12	−0·2	−0·5	11·8	...	...	...	...	...	...	...
	15	−5·8	+1·0	11·0	...	...	...	...	...	...	...
	16	−0·1	−0·4	13·3	...	...	...	...	...	...	...
	17	−0·5	+0·3	12·5	...	...	...	...	...	...	...
χ Cygni * ...	1*l*	−4·5	+6·1	7·5	$6{\cdot}86_{10}$	$7{\cdot}42_{5}$	$7{\cdot}46_{20}$	$7{\cdot}18_{31}$	+·19	−·13	−·5
	2*p*	−3·9	−1·4	8·0	$7{\cdot}73_{22}$	$8{\cdot}13_{7}$	$8{\cdot}19_{20}$	$7{\cdot}97_{49}$	+·15	+·12	−·2
	3*r*	−1·3	−3·7	8·4	$8{\cdot}14_{10}$	$8{\cdot}56_{7}$	$8{\cdot}52_{34}$	$8{\cdot}31_{51}$	+·16	+·07	−·3
	5*s*	−2·8	+4·5	9·0	$8{\cdot}54_{16}$	$8{\cdot}72_{5}$	$8{\cdot}90_{24}$	$8{\cdot}64_{45}$	+·13	−·23	−·6
	10	−2·2	+0·3	9·5	$9{\cdot}08_{6}$	$9{\cdot}39_{17}$	$9{\cdot}41_{17}$	$9{\cdot}18_{42}$	+·06	−·26	−·5
	14*w*	−1·2	+2·6	9·3	$9{\cdot}30_{10}$	$9{\cdot}44_{16}$	$9{\cdot}36_{34}$	$9{\cdot}29_{50}$	+·09	+·08	−·2
	15*y*	−2·4	−0·4	9·9	$9{\cdot}58_{17}$	$9{\cdot}80_{7}$	$9{\cdot}93_{10}$	$9{\cdot}82_{34}$	+·01	−·07	−·2
	16	−2·2	0·0	10·0	$9{\cdot}63_{10}$	$10{\cdot}18_{6}$	$9{\cdot}84_{7}$	$9{\cdot}88_{23}$	·00	−·12	−·2
	22	−0·5	−1·0	10·8	$10{\cdot}34_{18}$	$10{\cdot}73_{11}$	$10{\cdot}98_{24}$	$10{\cdot}69_{53}$	−·01	−·12	+·2
	23	−0·7	−0·8	10·8	$10{\cdot}35_{19}$	$10{\cdot}68_{10}$	$10{\cdot}95_{20}$	$10{\cdot}67_{54}$	−·01	−·14	+·2
	24	0·0	−0·5	11·5	$11{\cdot}89_{12}$	$11{\cdot}91_{10}$	$12{\cdot}12_{6}$	$11{\cdot}99_{28}$	−·02	+·47	+1·1
	25	0·0	−1·0	11·5	$11{\cdot}84_{14}$	$11{\cdot}88_{9}$	$11{\cdot}92_{6}$	$11{\cdot}92_{29}$	−·03	+·39	+1·0
	26	−0·5	0·0	11·5	$11{\cdot}74_{19}$	$11{\cdot}80_{7}$	$12{\cdot}02_{6}$	$11{\cdot}89_{32}$	−·03	+·36	+1·0
S Cygni ...	*c*	−3·6	−2·1	8·8	$8{\cdot}60_{11}$	...	...	$8{\cdot}85_{11}$	−·07	−·02	+·1
	d	0·0	+0·2	9·2	$9{\cdot}01_{32}$	$9{\cdot}35_{2}$	...	$9{\cdot}27_{34}$	−·04	+·03	+·1
	e	−2·0	+0·6	9·5	$9{\cdot}56_{7}$	$9{\cdot}90_{1}$	...	$9{\cdot}81_{8}$	−·21	+·10	+·2
	f	−0·8	−0·3	10·0	$10{\cdot}09_{20}$	$10{\cdot}19_{28}$	$10{\cdot}62_{11}$	$10{\cdot}28_{78}$	−·06	+·22	+·3
	g	+1·7	−0·9	10·3	$10{\cdot}02_{49}$	$10{\cdot}09_{20}$	$10{\cdot}52_{11}$	$10{\cdot}17_{80}$	−·06	−·19	−·1
	k	+0·7	−1·2	11·1	$11{\cdot}20_{19}$	$11{\cdot}31_{13}$	$11{\cdot}50_{23}$	$11{\cdot}34_{55}$	−·05	+·19	+·3
	l	+0·5	−0·1	11·4	$11{\cdot}27_{14}$	$11{\cdot}33_{15}$	$11{\cdot}49_{35}$	$11{\cdot}36_{64}$	−·05	−·09	·0
	a	−1·7	−5·0	7·9	...	...	...	...	...	...	...
T Cephei † ...	*d*	−2·0	−2·9	6·7	$6{\cdot}60_{102}$	$7{\cdot}17_{10}$	$7{\cdot}42_{42}$	$6{\cdot}96_{180}$	+·05	+·31	+·2

* A few comparisons of χ Cygni with stars numbered 4, 6, 7, 8, 9, 11, 12, 13*a*, 17, 18, 20, 28, 29. have been omitted.

N.B.—The corrections were so large that the magnitudes of the comparison star were recomputed with the corrected values: *i.e.* the *adopted* magnitudes on p. 104 &c. are as follows:

Star	1	2	3	5	10	14	15	16	22	23	24	25	26
Adopted Magnitude ...	7·0	7·8	8·1	8·4	9·0	9·1	9·7	9·8	11·0	11·0	12·6	12·5	12·5

and no further "corrections for stars" were computed.

† From 1900 January 1 Knott's comparison stars for T Cephei were used (*Mem. R.A.S.* vol. lii.). It may be convenient here to give the correspondence of the two sets, although no observations after 1899 December 31 are included in the present volume

Peek	*d*	*m*	*n*	*h*	*l*
Knott	*a*	*d*	*e*	*c*	*f*

See also the note in § 52 about the general accordance of the above corrections with Harvard.

Table XI.—*continued.*

Variable.	Number or Letter.	Peek Coords.		Adopted Mag.	Inferred Magnitude.				Correction for Scale.	Inferred Correction.	Adopted Correction.
		x	y		−2·0 to −0·5	−0·4 to +0·4	+0·5 to +2·0	Mean.			
T Cephei—*cont.*	*f*	+7·2	− 2·0	7·7	$7{\cdot}69_{22}$	$7{\cdot}89_{10}$	$8{\cdot}22_{22}$	$7{\cdot}97_{101}$	+·03	+·30	+·3
	g	+4·1	− 4·3	8·2	$8{\cdot}25_{22}$	$8{\cdot}39_{12}$	$8{\cdot}52_{76}$	$8{\cdot}35_{121}$	+·03	+·18	+·1
	h	−2·6	+ 1·4	8·1	$8{\cdot}19_{18}$	$8{\cdot}12_{6}$	$8{\cdot}33_{80}$	$8{\cdot}23_{123}$	+·06	+·19	+·1
	l	−2·9	+ 1·7	9·2	$9{\cdot}04_{15}$	$9{\cdot}20_{11}$	$9{\cdot}20_{64}$	$9{\cdot}06_{100}$	+·06	−·08	−·2
	m	+1·8	− 0·8	9·7	$9{\cdot}23_{19}$	9 59$_{12}$	$9{\cdot}48_{99}$	$9{\cdot}29_{130}$	+·01	−·40	−·5
	n	+1·5	+ 0·5	10·1	$9{\cdot}90_{2}$	$9{\cdot}84_{12}$	$10{\cdot}05_{90}$	$9{\cdot}90_{104}$	+·02	−·18	−·3
	p	−1·0	+ 0·4	11·1	...	...	...	...	...	...	...
	q	−0·2	+ 1·9	11·6	...	...	...	...	...	...	...
	r	−1·9	+ 0·6	12·0	...	...	...	...	...	...	...
S Cephei ...	3	−2·2	− 3·4	8·6	$8{\cdot}36_{24}$	8 85$_{2}$	...	$8{\cdot}67_{26}$	+·06	+·13	·0
	4	−1·4	− 3·7	8·6	$8{\cdot}45_{21}$	$8{\cdot}90_{4}$	...	$8{\cdot}77_{25}$	+·05	+·22	+·1
	9	+0·8	− 3·0	9·8	$9{\cdot}79_{8}$	$9{\cdot}95_{1}$	$10{\cdot}12_{9}$	$9{\cdot}94_{21}$	+·03	+·17	·0
	10	−0·7	+ 2·2	10·2	$9{\cdot}74_{20}$	$10{\cdot}05_{13}$	$10{\cdot}05_{10}$	$9{\cdot}94_{51}$	+·01	−·25	−·4
	12*k*	−1·7	+ 0·2	10·6	$10{\cdot}07_{27}$	$10{\cdot}42_{6}$	$10{\cdot}65_{80}$	$10{\cdot}35_{73}$	−·01	−·26	−·4
	13*m*	0·0	− 1·4	11·3	$11{\cdot}46_{16}$	$11{\cdot}48_{11}$	$11{\cdot}76_{22}$	$11{\cdot}57_{52}$	−·07	+·20	+·1
	14*g*	−1·7	− 1·5	9·5	$9{\cdot}55_{22}$	$9{\cdot}93_{10}$	$10{\cdot}02_{13}$	$9{\cdot}83_{15}$	+·01	+·34	+·2
	15	−1·9	− 1·1	11·3	$11{\cdot}55_{8}$	$11{\cdot}99_{8}$	$12{\cdot}01_{16}$	$11{\cdot}84_{32}$	−·09	+·45	+·4
	16	−3·2	− 3·9	9·5	$9{\cdot}73_{6}$	$9{\cdot}87_{2}$	$10{\cdot}15_{2}$	$9{\cdot}86_{11}$	−·03	+·33	+·3
	17	−2·8	+ 2·0	10·5	$10{\cdot}04_{19}$	$10{\cdot}42_{6}$	$10{\cdot}61_{8}$	$10{\cdot}32_{33}$	−·03	−·21	−·4
	18	−3·3	+ 1·8	11·0	$10{\cdot}77_{22}$	$11{\cdot}05_{14}$	$11{\cdot}55_{10}$	$11{\cdot}08_{46}$	−·07	+·01	−·1
	19	−3·0	+ 0·2	11·2	$11{\cdot}44_{8}$	$11{\cdot}78_{6}$	$12{\cdot}15_{8}$	$11{\cdot}81_{19}$	−·10	+·51	+·5
	2*c*	+6·2	+ 4·6	7·6	...	...	...	...	...	...	...
	5*e*	+0·7	+ 5·3	8·9	...	...	...	...	...	...	...
	8	+6·5	− 6·1	10·0	...	...	...	...	...	...	...
	20	−2·3	+ 1·2	11·7	...	...	...	...	...	...	...
	21*o*	−0·8	− 1·6	12·5	...	...	...	...	...	...	...
	c	+6·2	+ 4·6	8·2	$7{\cdot}71_{88}$	$8{\cdot}07_{4}$	$8{\cdot}78_{9}$	$8{\cdot}00_{100}$	+·05	−·15	−·1
	e	+0·7	+ 5·3	9·0	$8{\cdot}87_{75}$	$9{\cdot}11_{17}$	$9{\cdot}49_{65}$	$9{\cdot}17_{157}$	+·04	+·21	+·3
	g	−1·7	− 1·5	9·8	$9{\cdot}54_{56}$	$9{\cdot}70_{18}$	$9{\cdot}96_{101}$	$9{\cdot}74_{173}$	+·04	−·02	·0
	h	−1·7	+ 0·2	10·2	$10{\cdot}20_{26}$	$10{\cdot}34_{7}$	$10{\cdot}47_{100}$	$10{\cdot}33_{133}$	+·03	+·16	+·2
	k	+2·0	+ 0·2	10·7	$10{\cdot}36_{17}$	$10{\cdot}56_{12}$	$10{\cdot}58_{61}$	$10{\cdot}46_{90}$	+·03	−·21	−·2
	l	+3·3	+ 0·4	11·0	$10{\cdot}53_{16}$	$10{\cdot}70_{13}$	$10{\cdot}73_{79}$	$10{\cdot}60_{108}$	+·04	−·36	−·3
	m	0·0	− 1·4	11·6	...	...	...	...	...	...	...
R Cassiopeiæ ...	1*g*	−0·7	−10·9	7·4	$6{\cdot}79_{7}$	$7{\cdot}05_{2}$	7 37$_{13}$	$7{\cdot}07_{22}$	+·22	−·11	−·3
	2*k*	+2 0	− 6·4	7·7	$6{\cdot}99_{16}$	$7{\cdot}70_{3}$	$7{\cdot}71_{14}$	$7{\cdot}38_{33}$	+·19	−·13	−·3
	3*k*	+1·1	− 9·7	8·1	$7{\cdot}33_{12}$	$7{\cdot}77_{6}$	$7{\cdot}87_{10}$	$7{\cdot}62_{28}$	+·19	−·29	−·4
	4*l*	+1·5	−11·2	8·3	$7{\cdot}81_{9}$	$8{\cdot}10_{2}$	$8{\cdot}54_{26}$	$8{\cdot}20_{37}$	+·19	+·09	·0
	6	−0·9	− 7 3	9·0	$8{\cdot}75_{10}$	$8{\cdot}85_{1}$	$9{\cdot}32_{15}$	9 01$_{29}$	+·09	+·10	+·1
	7	0·0	− 3 1	9·1	$9{\cdot}01_{8}$	$9{\cdot}22_{5}$	$9{\cdot}62_{15}$	$9{\cdot}26_{28}$	+·06	+·22	+·3
	8*n*	+0·3	− 0 9	9·5	$8{\cdot}96_{14}$	$9{\cdot}32_{5}$	$9{\cdot}66_{21}$	$9{\cdot}32_{40}$	+·06	−·12	−·1
	9	+3·3	− 7·0	9·1	$8{\cdot}06_{5}$	$8{\cdot}40_{2}$	$9{\cdot}11_{14}$	$8{\cdot}67_{21}$	+·20	−·23	−·4
	12	−1·4	− 9·8	9·5	$9{\cdot}40_{2}$	$9{\cdot}23_{4}$	$9{\cdot}65_{4}$	$9{\cdot}40_{11}$	+·02	−·08	·0
	14*o*	−1·0	− 1·8	9·5	$9{\cdot}21_{18}$	$9{\cdot}73_{7}$	$9{\cdot}88_{17}$	$9{\cdot}58_{37}$	+·04	+·12	+·2
	15*p*	+1·6	+ 0·3	10·0	$10{\cdot}40_{6}$	$10{\cdot}44_{8}$	$10{\cdot}61_{8}$	$10{\cdot}48_{19}$	−·01	+·47	+·6
	16	−0·6	− 2 0	11·0	$10{\cdot}60_{2}$	$10{\cdot}70_{2}$	$11{\cdot}13_{7}$	$10{\cdot}85_{13}$	+·02	−·13	−·1
	17*q*	+1·0	− 1·0	11·2	$10{\cdot}65_{2}$	$11{\cdot}03_{4}$	$11{\cdot}22_{11}$	$11{\cdot}00_{17}$	·00	−·20	−·1
	10	+4·1	− 7·5	9·6	...	...	...	...	...	...	...
	11	+4·1	− 6·5	9·9	...	...	...	...	...	...	...

TABLE XI.—*continued.*

Variable.	Number or Letter.	Peck Coords. x	Peck Coords. y	Adopted Mag.	Inferred Magnitude. −2·0 to −0·5.	Inferred Magnitude. −0·4 to +0·4.	Inferred Magnitude. +0·5 to +2·0.	Inferred Magnitude. Mean.	Correction for Scale.	Inferred Correction.	Adopted Correction.
R Cassiopeiæ—*cont.*	13	−5·4	− 6·2	9·4	...	...	...	...	...	...	...
	15	+1·1	+ 0·3	10·0	...	...	...	...	...	...	...
	18	+1·4	− 0·7	11·2	...	...	...	...	...	...	...
	ar	0·0	+ 0·3	10·5	...	...	...	...	...	...	...
	g	−0·7	−10·9	6·7	$6{\cdot}54_{16}$	$6{\cdot}82_{6}$	$7{\cdot}13_{20}$	$6{\cdot}85_{52}$	+·16	+·31	+·4
	h	+2·0	− 6·4	7·2	$6{\cdot}88_{20}$	$7{\cdot}19_{7}$	$7{\cdot}32_{24}$	$7{\cdot}12_{80}$	+·11	+·03	+·1
	k	+1·1	− 9·7	7·5	$7{\cdot}31_{26}$	$7{\cdot}54_{12}$	$7{\cdot}62_{23}$	$7{\cdot}47_{80}$	+·10	+·07	+·1
	l	+1·5	−11·2	8·2	$7{\cdot}84_{15}$	$8{\cdot}19_{20}$	$8{\cdot}24_{29}$	$8{\cdot}08_{164}$	+·09	−·03	·0
	n	+0·3	− 0·9	9·4	$8{\cdot}90_{20}$	$9{\cdot}42_{8}$	$9{\cdot}56_{28}$	$9{\cdot}25_{100}$	+·07	−·08	−·1
	o	−1·0	− 1·8	9·9	$9{\cdot}47_{20}$	$9{\cdot}68_{17}$	$9{\cdot}74_{31}$	$9{\cdot}61_{164}$	+·05	−·24	−·3
	p	+1·6	+ 0·3	10·5	$10{\cdot}45_{21}$	$10{\cdot}54_{16}$	$10{\cdot}73_{17}$	$10{\cdot}56_{84}$	+·02	+·08	·0
	q	+1·0	− 1·0	11·0	$11{\cdot}20_{14}$	$11{\cdot}32_{11}$	$11{\cdot}45_{21}$	$11{\cdot}31_{46}$	+·01	+·32	+·3
	r	0·0	+ 0·3	11·4	$10{\cdot}93_{8}$	$11{\cdot}48_{16}$	$11{\cdot}45_{12}$	$11{\cdot}31_{70}$	+·01	−·08	−·2
	s	+1·4	− 0·7	11·8	$11{\cdot}03_{4}$	$11{\cdot}35_{4}$	$11{\cdot}78_{22}$	$11{\cdot}53_{30}$	−·02	−·29	−·4

85. Returning to the "mean magnitude" M, it has been formed by the use of adopted magnitudes of five comparison stars, and it is just these adopted magnitudes which we are proceeding to correct. If we denote the required corrections to five stars, a, b, c, d, e, used in one night's observation, by α, β, γ, δ, ϵ, then by the procedure above indicated we have obtained a value, *not* for a simply, but for $a-\frac{1}{5}(\alpha+\beta+\gamma+\delta+\epsilon)$, or, say, $\frac{1}{5}(4\alpha-\beta-\gamma-\delta-\epsilon)$. On another night a may be compared with e, f, g, h; and denoting the corrections to these by ϵ, ζ, η, θ, we shall get from the mean of the pair of results for a

$$\tfrac{1}{10}(8\alpha-\beta-\gamma-\delta-2\epsilon-\zeta-\eta-\theta)$$

and so on.

86. Generalising, suppose that a is observed (ab) times with b, (ac) times with c, (ad) times with d, and so on, and let the total number of *nights* on which a is compared be A, so that

$$4A = (ab)+(ac)+(ad)+ \&c.$$

Then the mean value of the correction inferred for a, given in column 10 of Table XI., is really the value of the expression

$$\frac{1}{5A}[4A\alpha-(ab)\beta-(ac)\gamma-(ad)\delta-\&c.]$$

or, putting α_0, β_0, &c. for the quantities found in Table XI., column 10, we have a series of equations of the form

$$\alpha = \tfrac{4}{5}\alpha_0+\frac{1}{4A}[(ab)\beta+(ac)\gamma+(ad)\delta+ \ldots]$$

$$\beta = \tfrac{4}{5}\beta_0+\frac{1}{4B}[(ba)\alpha+(bc)\gamma+(bd)\delta+ \ldots]$$

$$\gamma = \tfrac{4}{5}\gamma_0+\frac{1}{4C}[(ca)\alpha+(cb)\beta+(cd)\delta+ \ldots] \&c.$$

where, of course, $(ab) = (ba)$, and

$$4A = (ab)+(ac)+(ad)+ \ldots$$
$$4B = (ba)+(bc)+(bd)+ \text{ \&c.}$$

87. The solution of these simultaneous equations will give α, β, γ, &c. when one of them is arbitrarily assumed zero, for the equations are not independent (indeed, it is obvious from general considerations that we are only dealing with relative magnitudes). But to solve the equations directly would involve an enormous amount of labour. There are thirty-three sets of equations, averaging ten in each set. This is the point in the work at which the difficulties of deciding on the proper course, already alluded to, became troublesome. Everything pointed to some approximate method of solving the equations, but it was not quite clear what this should be. Little questions arose such as these :

Was it necessary to form the accurate coefficients (ab), (ac), &c., which in itself involved a good deal of labour, or could some approximate values be found easily ?

Again, the sum $A\alpha_0+B\beta_0+C\gamma_0+ \ldots$ should *theoretically* be zero. *Practically*, owing to the restriction to one decimal place in much of the former work, it might amount to

$$\pm 0{\cdot}05(A+B+C+ \ldots)$$

How was this spurious residue to be dealt with ?

Again, if a solution had been obtained satisfying all the equations within $\pm 0{\cdot}05$, were there other and possibly *better* solutions, giving residuals still within the same limits, but better distributed ?

88. Such questions as these are not easily answered, so far as I am aware, by any algebraical investigation. The limits to be dealt with are numerical, and all the determining conditions are numerical ; we must work by "trial and error" a good deal, obtaining but little help from general principles. The problems are of a type not very common in astronomical work, though something of the kind occurs in finding the Greenwich "Personal Equations" every year. Those familiar with that investigation know that the equations, which are solved by successive approximations, sometimes show a tiresome reluctance to yield a final result ; one approximation after another is tried, a gradual but steady change taking place in one or more of the quantities to be found, which does not seem to slacken until the computer is almost weary. I have once or twice tried to formulate some method for securing quicker convergence, but have hitherto failed.

89. The method adopted in the present instance was as follows : The accurate coefficients (ab), (ac), &c. were found by actual counting. The values *to one place of decimals* of $\frac{5}{4}\alpha_0$, $\frac{5}{4}\beta_0$, $\frac{5}{4}\gamma_0$, &c. were adopted as a first approximation for α, β, γ, &c. and substituted in the terms in square brackets, the value of the bracket being found to 0·01 and added to the accurate value of $\frac{5}{4}\alpha_0$. The sum was then compared with the

adopted value (*i.e.* with $\frac{5}{4}a_0$ to one place), and the residuals formed. If the residuals ranged over less than 0·10 the result was accepted as satisfactory. If the range was greater, the adopted values corresponding to the residuals near the ends of the range were altered until accordance within 0·10 was secured. The "adopted corrections" thus found are given in column 11 of Table XI.

90. Attention may be called to the phrase "if the residuals ranged over less than 0·10." It was not generally possible to obtain residuals within the limits −0·05 to +0·05 owing to the fact, already mentioned, that the equations do not practically add up to zero as theoretically they should. But if the residuals ranged from, say, −0·02 to +0·07, the result was considered sufficiently good, the mean positive value being ascribed to the limitation of the former work to 0·1.

91. Two points of detail still remain to be noticed.

First, stars which have only been compared with the variable on one or two occasions have been omitted from the equations *directly*; but indirectly they still come in, because nights on which they have been observed with four others are retained in the equations. Thus we have an observation for *T Cassiopeiæ* as follows:

1890 February 3	9−1·0	13+0·3	17+0·1	18+1·0	20−0·5	10·7

which is used to infer the values of stars 9, 13, 17, and 18; although star 20, being only observed twice, is not taken into the equations. We might, of course, have rejected these nights, but if we begin to do so the process must be continued to an embarrassing extent, for if we strike out nights where stars 20 and 21 &c. are observed we shall lose some nights for stars 18 and 3 (of which the number of observations is already rather small), and perhaps have to strike them out also, when they may involve other stars in their downfall, and so on. On the other hand, to introduce all the stars observed once or twice only into the equations would be very troublesome. The course adopted was to assume that the errors for these stars insufficiently observed were zero. Thus if b be such a star in the example given above, then in the expression

$$\alpha = \tfrac{5}{4}a_0 + \tfrac{1}{4A}[(ab)\beta + (ac)\gamma + (ad)\delta + \ldots]$$

we assume $\beta = 0$ and the equation becomes

$$\alpha = \tfrac{5}{4}a_0 + \tfrac{1}{4A}[(ac)\gamma + (ad)\delta + \ldots]$$

The effect of this procedure is that we no longer have

$$4A = (ac) + (ad) + \ldots$$

i.e. the divisor of the bracket is no longer to be obtained by adding together the coefficients (ac), (ad), &c., but will always be greater, since account must be taken of the coefficient (ab), which disappears. It is most readily obtained by multiplying by 4 the number of nights of observation, which can be obtained, for instance, from

Table XI., column 8. But this column is not to be taken quite as it stands, for the reason mentioned in the next paragraph.

92. Secondly, in forming a_0, β_0, &c. in Table XI. we have omitted recorded differences greater than two whole magnitudes. If, for instance, we have a series

$$a-3\cdot0 \quad b-2\cdot0 \quad c-1\cdot0 \quad =d \quad e+0\cdot5$$

the result is used to infer magnitudes for b, c, d, and e, but not for a. This affects a_0, but the effect is in all probability beneficial. The coefficients (ab), (ac), (ad), (ae) will also be counted too large in the a equation by unity, though (ba), (ca), (da), and (ea) are correct in the β, γ, δ, ϵ equations respectively. But since the number of such omitted observations is never large, no serious error will be made by using the counted values of (ab), (ac), &c. without any allowance for these omissions. We must, however, increase the totals of Table XI., column 8, by the number of omitted observations before using them as in the last paragraph. The rule adopted has therefore been to use four times the total number of observations instead of the sum $(ab)+(ac)+$ &c., *unless* this sum is the greater, which sometimes happens from the recording of more than five comparisons on the same night.

93. The actual equations used are given in Table XII. The coefficients (ab), (ac), &c. are given in an obvious manner, and column 4A has just been explained.

The column headed $\frac{5}{4}a_0$ is got by multiplying the tenth column of Table XI. by $\frac{5}{4}$. The column headed Σ gives the value of

$$\frac{1}{4A}[(ab)\beta+(ac)\gamma+(ad)\delta+\ldots]$$

in the notation just used. Sometimes a constant $\pm\cdot1$ has been added to the adopted values after computation of Σ; and in such cases the values of Σ have been increased by the same constant, though the coefficients do not strictly allow of this.

The column headed "Adopted" gives the adopted correction to the originally adopted magnitude, and is the sum of the two previous columns within a tenth of a magnitude, with the qualification mentioned in § 90. These figures are the results given in the eleventh column of Table XI.

TABLE XII.

T Cassiopeiæ.

*	3	4	5	6	7	8	9	13	17	18	4A.	$\frac{5}{4}a_0$	$\frac{1}{4A}\Sigma(ab)\beta$	Adopted
3	*	8	7	9	8	7	0	0	0	0	39	+·20	+·03	+·2
4	8	*	34	36	35	31	4	1	1	0	150	+·10	+·01	+·1
5	7	34	*	41	40	34	10	1	2	0	169	+·02	+·02	·0
6	9	36	41	*	49	41	19	5	10	2	212	+·11	−·02	+·1
7	8	35	40	49	*	40	16	2	7	2	199	−·04	+·01	·0
8	7	31	34	41	40	*	7	1	2	0	163	−·10	+·04	−·1
9	0	4	10	19	16	7	*	15	20	9	140	−·23	−·01	−·2
13	0	1	1	5	2	1	15	*	14	7	88	+·05	−·05	·0
17	0	1	2	10	7	2	20	14	*	9	100	−·19	−·02	−·2
18	0	0	0	2	2	0	9	7	9	*	44	+·21	−·08	+·1

TABLE XII.—*continued.*

T Cassiopeiæ.

*	b	d	e	f	g	h	k	l	m	n	p	4A	$\frac{5}{4}e_0$	Σ	Adopted
b	*	8	10	10	9	0	0	1	...	...	...	38	+·17	+·01	+·1
d	8	*	74	72	74	9	5	48	9	...	...	299	−·13	+·02	−·2
e	10	74	*	136	146	27	21	124	70	1	12	621	+·20	−·05	+·1
f	10	72	136	*	137	18	14	113	60	0	10	648	+·17	−·05	+·1
g	9	74	146	137	*	27	22	126	73	0	15	629	+·11	−·03	·0
h	0	9	27	18	27	*	35	42	37	5	18	218	+·17	−·05	+·1
k	0	5	21	14	22	35	*	42	42	5	17	203	+·36	−·08	+·2
l	1	48	124	113	126	42	42	*	91	5	33	625	−·13	·00	−·2
m	...	9	70	60	73	37	42	91	*	4	27	413	−·02	−·02	−·1
n	...	...	1	0	0	5	5	5	4	*	0	28	+·38	+·01	+·3
p	...	...	12	10	15	18	17	33	27	0	*	132	−·51	−·01	−·6

S Cassiopeiæ.

*	1	2	3	4	6	8	10	12	13	15	16	17	4A	$\frac{5}{4}e_0$	Σ	Adopted
1	*	7	5	9	9	7	1	0	0	0	0	0	38	+·09	+·05	+·1
2	7	*	5	12	12	11	4	2	1	0	0	0	54	+·44	−·02	+·4
3	5	5	*	7	6	6	1	1	1	0	0	0	32	+·30	+·03	+·3
4	9	12	7	*	21	22	14	13	13	1	1	7	120	−·09	+·04	−·1
6	9	12	6	21	*	20	10	8	8	0	0	2	96	·00	+·03	·0
8	7	11	6	22	20	*	18	18	17	1	0	11	131	−·19	+·04	−·2
10	1	4	1	14	10	18	*	25	27	9	11	16	136	−·11	+·03	−·1
12	0	2	1	13	8	18	25	*	34	13	17	15	152	+·21	·00	+·2
13	0	1	1	13	8	17	27	34	*	12	18	15	148	+·26	·00	+·2
15	0	0	0	1	0	1	9	13	12	*	12	2	56	+·28	+·09	+·3
16	0	0	0	1	0	0	11	17	18	12	*	4	72	+·09	+·10	+·2
17	0	0	0	7	2	11	16	15	15	2	4	*	72	−·54	+·04	−·5

S Cassiopeiæ.

*	b	c	g	k	l	m	n	o	p	4A	$\frac{5}{4}e_0$	Σ	Adopted
b	*	41	35	43	41	16	0	0	0	176	+·36	+·02	+·3
c	41	*	47	55	52	27	1	2	0	225	+·22	+·02	+·2
g	35	47	*	65	62	37	13	6	1	266	−·08	+·05	−·1
k	43	55	65	*	120	93	58	50	8	492	+·19	−·05	+·1
l	41	52	62	120	*	90	57	48	7	496	+·04	−·03	·0
m	16	27	37	93	90	*	55	47	7	372	−·28	+·01	−·3
n	0	1	13	58	57	55	*	46	3	233	+·19	−·11	·0
o	0	2	6	50	48	47	46	*	3	202	−·25	−·04	−·3
p	0	0	1	8	7	7	3	3	*	36	+·46	−·06	+·3

Table XII.—*continued.*

S Persei.

*	*a*	*b*	*c*	*f*	*g*	*k*	*l*	4A	$\frac{5}{4}a_0$	Σ	Adopted
a	*	61	60	61	61	0	1	244	−·11	+·10	−·1
b	61	*	152	152	154	57	34	600	+·06	+·11	·0
c	60	152	*	162	163	65	44	656	−·14	+·13	−·1
f	61	152	162	*	163	65	45	648	+·19	+·08	+·1
g	61	154	163	163	*	65	45	651	+·49	+·01	+·4
k	0	57	65	65	65	*	8	260	+·26	+·10	+·2
l	1	34	44	45	45	8	*	177	−·06	+·11	−·1

R Aurigæ.

*	3	4	5	6	7	8	9	12	25	26	29	4A	$\frac{5}{4}a_0$	Σ	Adopted
3	*	11	7	4	12	3	10	...	...	...	...	52	+·45	−·18	+·3
4	11	*	16	19	26	7	15	1	3	6	1	108	+·12	−·15	·0
5	7	16	*	13	20	7	14	0	2	5	0	84	−·01	−·13	−·2
6	4	19	13	*	27	10	10	5	17	19	10	148	·00	−·07	−·1
7	12	26	20	27	*	13	18	1	10	12	3	152	−·45	−·02	−·5
8	3	7	7	10	13	*	6	0	4	4	0	54	+·39	−·16	+·2
9	10	15	14	10	18	6	*	0	1	1	0	80	−·10	−·11	−·2
12	0	1	0	5	·1	0	0	*	8	9	9	56	−·08	+·04	−·1
25	0	3	2	17	10	4	1	8	*	19	14	80	+·15	−·04	+·1
26	0	6	5	19	12	4	1	9	19	*	13	92	+·09	−·04	·0
29	0	1	0	10	3	0	0	9	14	13	*	80	+·32	−·02	+·3

R Aurigæ.

*	*a*	*d*	*e*	*f*	*g'*	*h*	*k*	*l*	*m*	4A	$\frac{5}{4}a_0$	Σ	Adopted
a	*	42	57	55	52	13	3	3	3	228	+·11	+·09	+·2
d	42	*	51	51	47	10	1	0	2	204	+·16	+·09	+·2
e	57	51	*	86	83	39	10	15	11	356	−·29	+·16	−·2
f	55	51	86	*	118	69	16	46	45	488	+·14	+·06	+·2
g	52	47	83	118	*	76	25	57	55	513	+·16	+·05	+·2
h	13	10	39	69	76	*	19	63	58	352	+·22	+·02	+·2
k	3	1	10	16	25	19	*	16	17	118	−·38	+·06	−·3
l	3	0	15	46	57	63	16	*	57	280	·00	+·05	·0
m	3	2	11	45	55	58	17	57	*	268	−·28	+·09	−·2

U Orionis.

	1	2	3	4	5	6	7	8	9	10	11	16	4A	$\frac{5}{4}a_0$	Σ	Adopted
1	*	50	50	43	1	1	0	0	0	3	1	50	200	+·39	−·13	+·2
2	50	*	119	108	37	22	2	0	0	26	14	95	492	+·16	−·12	·0
3	50	119	*	110	40	22	2	0	0	27	14	96	512	+·14	−·12	·0
4	43	108	110	*	41	21	17	10	9	38	27	81	540	−·49	·00	−·5
5	1	37	40	41	*	18	3	2	0	7	3	23	176	+·28	−·15	+·1

Table XII.—*continued.*

U Orionis—*continued.*

*	1	2	3	4	5	6	7	8	9	10	11	16	4A	$\frac{5}{4}a_0$	Σ	Adopted
6	1	22	22	21	18	*	1	2	0	3	2	10	140	−·08	−·07	−·2
7	0	2	2	17	3	1	*	27	27	36	32	0	148	+·62	−·06	+·5
8	0	0	0	10	2	2	27	*	22	27	27	0	116	+·32	+·01	+·3
9	0	0	0	9	0	0	27	22	*	28	27	0	112	+·28	+·02	+·3
10	3	26	27	38	7	3	36	27	28	*	41	14	268	−·08	−·01	−·1
11	1	14	14	27	3	2	32	27	27	41	*	6	208	−·39	+·07	−·4
16	50	95	96	81	23	10	0	0	0	14	6	*	376	+·06	−·09	−·1

R Lyncis.

*	*a*	*e*	*f*	*g*	*h*	*k*	*l*	*m*	*n*	4A	$\frac{5}{4}$ *	Σ	Adopted
a	*	42	63	46	61	18	1	17	0	248	+·26	+·02	+·3
e	42	*	70	60	65	27	1	21	0	288	+·06	+·05	+·1
f	63	70	*	94	139	101	24	93	4	588	−·16	+·08	−·1
g	46	60	94	*	95	62	11	55	3	428	+·09	+·04	+·1
h	61	65	139	95	*	118	47	110	20	656	+·11	+·05	+·1
k	18	27	101	62	118	*	51	119	26	520	−·15	+·08	−·1
l	1	1	24	11	47	51	*	48	23	204	+·65	·00	+·6
m	17	21	93	55	110	119	48	*	25	488	−·20	+·08	−·1
n	0	0	4	3	20	26	23	25	*	100	+·21	+·11	+·3

R Ursæ Majoris.

*	1	2	3	6	7	8	9	10	11	17	19	20	21	4A	$\frac{5}{4}a_0$	Σ	Adopted
1	*	32	32	22	30	2	2	9	0	0	0	0	0	129	+·32	−·04	+·2
2	32	*	46	37	44	6	2	17	1	0	0	0	0	185	−·19	+·05	−·2
3	32	46	*	40	48	13	10	25	8	2	0	0	0	224	−·05	+·04	−·1
6	22	37	40	*	40	6	2	11	1	0	0	0	0	168	+·05	·00	·0
7	30	44	48	40	*	8	2	17	1	0	0	0	0	192	+·15	−·02	+·1
8	2	6	13	6	8	*	10	8	8	3	1	0	0	68	−·11	+·07	−·1
9	2	2	10	2	2	10	*	13	10	5	1	0	0	60	−·08	+·10	·0
10	9	17	25	11	17	8	13	*	14	9	0	3	4	140	+·20	+·06	+·2
11	0	1	8	1	1	8	10	14	*	21	10	14	14	112	+·10	+·21	+·2
17	0	0	2	0	0	3	5	9	21	*	10	14	14	92	+·50	+·17	+·6
19	0	0	0	0	0	1	1	0	10	10	*	9	8	52	+·04	+·26	+·2
20	0	0	0	0	0	0	0	3	14	14	9	*	13	68	−·02	+·28	+·2
21	0	0	0	0	0	0	0	4	14	14	8	13	*	68	+·15	+·26	+·3

Table XII.—*continued.*

R Ursæ Majoris.

•	*a*	*h*	*n*	*o*	*p*	*q*	*r*	*s*	*t*	4Δ	$\frac{5}{4}a_0$	Σ	Adopted
a	*	56	56	55	42	11	5	0	0	225	+1·10	+·06	+1·2
h	56	*	95	92	76	31	26	5	0	381	+ ·52	+·07	+ ·6
n	56	95	*	116	111	65	70	40	8	561	− ·06	+·11	·0
o	55	92	116	*	94	47	53	23	6	486	− ·35	+·18	− ·2
p	42	76	111	94	*	94	98	74	44	633	− ·25	+·07	− ·2
q	11	31	65	47	94	*	84	72	45	449	+ ·16	−·07	+ ·1
r	5	26	70	53	98	84	*	87	50	473	· ·24	−·03	− ·3
s	0	5	40	23	74	72	87	*	51	352	+ ·05	−·11	− ·1
t	0	0	8	6	44	45	50	51	*	204	+ ·04	−·13	− ·1

T Ursæ Majoris.

•	1	2	3	4	5	6	8	9	11	12	13	14	15	16	17	4Δ	$\frac{5}{4}a_0$	Σ	Adopted
1	*	39	40	33	13	35	0	0	0	0	0	0	0	0	0	160	+·19	−·10	+·1
2	39	*	42	33	16	38	1	2	0	0	1	0	0	0	0	172	+·11	−·08	·0
3	40	42	*	37	20	41	1	2	0	0	3	0	0	0	0	186	+·06	−·09	·0
4	33	33	37	*	15	36	5	5	1	1	1	0	0	0	0	167	+·06	−·10	·0
5	13	16	20	15	*	20	13	14	1	0	10	2	2	2	1	129	+·28	−·15	+·1
6	35	38	41	36	20	*	6	6	0	0	3	0	1	0	0	186	−·55	+·01	−·5
8	0	1	1	5	13	6	*	24	11	9	12	12	4	5	1	104	−·12	−·20	−·3
9	0	2	2	5	14	6	24	*	11	8	13	14	4	6	3	112	−·16	−·18	−·3
11	0	0	0	1	1	0	11	11	*	11	3	12	3	1	3	57	−·49	−·16	−·6
12	0	0	0	1	0	0	9	8	11	*	2	12	5	3	5	55	−·20	−·17	−·4
13	0	1	3	1	10	3	12	13	3	2	*	15	16	15	14	108	−·11	−·06	−·2
14	0	0	0	0	2	0	12	14	12	12	15	*	17	18	18	120	+·26	−·16	+·1
15	0	0	0	0	2	1	4	4	3	5	16	17	*	18	19	89	+·31	−·09	+·2
16	0	0	0	0	2	0	5	6	1	3	15	18	18	*	17	85	−·22	+·01	−·2
17	0	0	0	0	1	0	1	3	3	5	14	18	19	17	*	81	+·25	−·07	+·2

T Ursæ Majoris.

•	*e*	*f*	*g*	*h*	*k*	*l*	*m*	*n*	*o*	*q*	*r*	4Δ	$\frac{5}{4}a_0$	Σ	Adopted
e	*	86	82	83	82	13	8	0	0	1	1	356	−·04	+·03	−·1
f	86	*	89	91	91	22	12	0	0	1	1	393	−·04	+·03	−·1
g	82	89	*	106	103	38	26	0	0	3	0	447	+·26	−·02	+·2
h	83	91	106	*	111	51	37	0	0	11	6	496	−·01	+·02	·0
k	82	91	103	111	*	69	57	2	1	33	26	575	−·01	+·02	·0
l	13	22	38	51	69	*	66	16	10	52	45	382	+·26	−·02	+·2
m	8	12	26	37	57	66	*	24	18	57	53	358	+·05	+·01	·0
n	0	0	0	0	2	16	24	*	22	27	27	120	+·19	−·07	+·1
o	0	0	0	0	1	10	18	22	*	20	23	94	−·22	·00	−·3
q	1	1	3	11	33	52	57	27	20	*	55	260	−·08	+·01	−·1
r	1	1	0	6	26	45	53	27	23	55	*	237	−·08	·00	−·1

TABLE XII.—*continued.*

S Ursæ Majoris.

*	1	2	3	4	5	6	10	11	12	13	14	15	16	17	21	4A	$\frac{5}{4}a_0$	Σ	Adopted
1	*	23	23	10	23	14	0	0	0	0	0	0	0	0	0	93	+·51	−·06	+·4
2	23	*	44	24	46	36	0	1	1	2	1	2	1	1	0	182	−·19	+·04	−·2
3	23	44	*	25	48	38	2	3	1	1	1	3	1	0	0	190	+·05	−·01	·0
4	10	24	25	*	34	24	4	3	1	1	3	6	3	2	0	140	−·04	·00	−·1
5	23	46	48	34	*	54	8	10	4	5	4	10	11	4	0	261	+·04	+·01	·0
6	14	36	38	24	54	*	8	9	3	6	4	12	9	4	0	221	+·08	·00	·0
10	0	0	2	4	8	8	*	36	30	21	5	7	8	2	18	149	+·44	−·09	+·3
11	0	1	3	3	10	9	36	*	29	21	6	8	8	0	18	156	−·26	+·05	−·3
12	0	1	1	1	4	3	30	29	*	30	9	11	11	8	19	172	+·04	·00	·0
13	0	2	1	1	5	6	21	21	30	*	10	15	11	7	12	142	+·29	−·03	+·2
14	0	1	1	3	4	4	5	6	9	10	*	8	9	3	1	64	−·51	+·10	−·5
15	0	2	3	6	10	12	7	8	11	15	8	*	15	7	1	105	+·11	+·05	+·1
16	0	1	1	3	11	9	8	8	11	11	9	15	*	9	1	97	+·60	−·01	+·5
17	0	1	0	2	4	4	2	0	8	7	3	7	9	*	2	49	+·09	+·09	+·1
21	0	0	0	0	0	0	18	18	19	12	1	1	1	2	*	72	−·45	+·04	−·5

S Ursæ Majoris.

*	*a*	*b*	*c*	*f*	*g*	*k*	*l*	*m*	*n*	*o*	*p*	4A	$\frac{5}{4}a_0$	Σ	Adopted
a	*	49	47	48	48	3	8	5	0	0	0	208	+·02	+·06	·0
b	49	*	105	81	103	33	67	57	3	0	0	498	+·16	·00	+·1
c	47	105	*	76	90	28	54	41	2	0	0	443	+·18	+·01	+·1
f	48	81	76	*	119	41	71	66	14	2	1	519	+·09	+·01	·0
g	48	103	90	119	*	62	98	89	20	3	1	633	+·25	−·02	+·1
k	3	33	28	41	62	*	84	80	22	12	10	375	+·02	−·06	−·1
l	8	67	54	71	98	84	*	144	57	38	35	656	−·05	−·05	−·2
m	5	57	41	66	89	80	144	*	59	39	35	615	+·21	−·11	·0
n	0	3	2	14	20	22	57	59	*	31	28	236	−·26	−·11	−·5
o	0	0	0	2	3	12	38	39	31	*	31	156	+·24	−·23	−·1
p	0	0	0	1	1	10	35	35	28	31	*	141	−·16	−·18	−·4

S Boötis.

*	1	2	3	5	6	7	8	10	20	21	4A	$\frac{5}{4}a_0$	Σ	Adopted
1	*	9	15	11	5	10	8	0	1	1	60	+·19	−·03	+·1
2	9	*	11	8	5	9	4	0	0	0	48	+·29	−·04	+·2
3	15	11	*	20	13	24	18	1	6	3	111	+·11	−·03	·0
5	11	8	20	*	15	20	13	0	7	6	104	−·19	·00	−·2
6	5	5	13	15	*	15	10	1	7	6	80	+·11	−·04	·0
7	10	9	24	20	15	*	28	7	18	15	146	−·15	+·01	−·2
8	8	4	18	13	10	28	*	7	15	13	116	+·19	−·06	+·1
10	0	0	1	0	1	7	7	*	6	6	40	+·04	−·02	·0
20	1	0	6	7	7	18	15	6	*	16	84	+·16	−·06	+·1
21	1	0	3	6	6	15	13	6	16	*	76	−·05	−·02	−·1

Table XII.—*continued.*

S Boötis.

•	a	c	f	g	h	m	n	4A	$\frac{5}{4}a_0$	Σ	Adopted
a	*	88	87	89	85	0	0	360	+·30	+·05	+·3
c	88	*	120	122	118	34	1	483	+·02	+·09	·0
f	87	120	*	143	139	56	22	567	+·04	+·06	·0
g	89	122	143	*	142	58	24	568	+·10	+·04	+·1
h	85	118	139	142	*	58	24	566	+·10	+·04	+·1
m	0	34	56	58	58	*	24	231	−·20	+·02	−·2
n	0	1	22	24	24	24	*	95	−·26	·00	−·3

R Camelopardi.

•	1	2	3	8	9	11	4A	$\frac{5}{4}a_0$	Σ	Adopted
1	*	30	30	15	21	23	119	+·80	−·01	+·7
2	30	*	40	26	33	35	172	−·34	+·16	−·2
3	30	40	*	24	31	33	164	−·10	+·12	·0
8	15	26	24	*	23	19	140	+·02	+·06	·0
9	21	33	31	23	*	26	168	·00	+·08	·0
11	23	35	33	19	26	*	192	+·20	+·05	+·2

R Camelopardi.

•	b	c	e	g	h	k	m	4A	$\frac{5}{4}a_0$	Σ	Adopted
b	*	136	147	147	147	0	0	577	−·16	+·10	−·1
c	136	*	169	169	169	8	13	664	+·30	+·02	+·3
e	147	169	*	161	161	10	15	663	+·05	+·07	+·1
g	147	169	161	*	162	10	15	664	−·02	+·09	·0
h	147	169	161	162	*	10	15	664	−·08	+·09	·0
k	0	8	10	10	10	*	2	40	+·25	+·10	+·3
m	0	13	15	15	15	2	*	60	+·21	+·10	+·3

S Coronæ.

•	1	2	3	4	6	8	10	12	15	16	17	18	34	4A	$\frac{5}{4}a_0$	Σ	Adopted
1	*	0	87	33	0	25	49	65	21	14	113	109	0	516	+·48	−·24	+·2
2	0	*	0	0	9	21	19	0	13	18	0	0	0	84	+·12	+·26	+·3
3	87	0	*	21	0	1	19	56	5	1	89	88	0	368	−·25	−·17	−·5
4	33	0	21	*	0	11	17	20	11	4	29	27	0	176	+·32	−·11	+·1
6	0	9	0	0	*	19	17	0	11	16	0	0	0	84	+·20	+·23	+·4
8	25	21	1	11	19	*	81	8	62	61	19	13	8	384	+·18	+·13	+·3
10	49	19	19	17	17	81	*	14	69	63	44	34	8	580	−·01	+·09	·0
12	65	0	56	20	0	8	14	*	6	2	66	65	0	316	−·22	−·17	−·4
15	21	13	5	11	11	62	69	6	*	57	18	7	7	360	+·35	+·11	+·4
16	14	18	1	4	16	61	63	2	57	*	10	2	8	296	+·30	+·16	+·4
17	113	0	89	29	0	19	44	66	18	10	*	117	0	608	−·26	−·10	−·4
18	109	0	88	27	0	13	34	65	7	2	117	*	0	548	−·08	−·15	−·3
34	0	0	0	0	0	8	8	0	7	8	0	0	*	40	−·48	+·21	−·3

Table XII.—*continued.*

R Ursæ Minoris

*	*a*	*b*	*c*	*d*	*f*	*g*	*h*	*k*	4A	$\frac{5}{4}a_0$	Σ	Adopted
a	*	90	114	149	150	49	21	12	600	+·12	−·12	·0
b	90	*	68	90	91	18	5	3	365	+·02	−·09	−·1
c	114	68	*	114	112	26	13	5	452	+·20	−·13	+·1
d	149	90	114	*	152	51	25	15	612	−·09	−·07	·0*
f	150	91	112	152	*	52	26	12	620	−·12	−·07	−·2
g	49	18	26	51	52	*	5	4	212	−·11	−·10	−·2
h	21	5	13	25	26	5	*	9	108	+·08	−·13	·0
k	12	3	5	15	12	4	9	*	68	−·24	−·11	−·3

* The adopted correction for *d* should be −·2. The error was discovered after the observations had been printed off.

R Draconis.

*	1	2	3	6	7	9	17	20	21	22	4A	$\frac{5}{4}a_0$	Σ	Adopted
1	*	17	20	18	13	13	0	0	0	0	81	−·14	−·15	−·3
2	17	*	28	26	21	21	0	1	0	0	114	−·21	−·11	−·4
3	20	28	*	40	32	35	0	7	1	0	172	−·31	−·07	−·4
6	18	26	40	*	36	37	1	12	6	3	189	+·39	−·17	+·2
7	13	21	32	36	*	29	4	14	8	6	163	−·10	−·05	−·2
9	13	21	35	37	29	*	1	11	4	2	156	+·29	−·13	+·1
17	0	0	0	1	4	1	*	6	6	6	68	+·24	−·08	+·1
20	0	1	7	12	14	11	6	*	13	10	84	+·51	−·03	+·4
21	0	0	1	6	8	4	6	13	*	9	84	−·05	+·01	−·1
22	0	0	0	3	6	2	6	10	9	*	88	+·45	−·08	+·3

R Draconis.

*	*a*	*f*	*g*	*h*	*k*	*n*	*o*	*q*	4A	$\frac{5}{4}a_0$	Σ	Adopted
a	*	80	76	82	82	4	2	2	328	−·16	+·05	−·1
f	80	*	95	114	115	23	17	13	457	·00	+·06	·0
g	76	95	*	98	100	15	8	6	398	+·11	+·02	+·1
h	82	114	98	*	162	70	65	57	648	+·06	+·07	+·1
k	82	115	100	162	*	74	69	61	663	−·02	+·10	·0
n	4	23	15	70	74	*	61	52	316	+·06	+·12	+·2
o	2	17	8	65	69	61	*	54	276	+·45	+·07	+·5
q	2	13	6	57	61	52	54	*	245	−·12	+·18	·0

TABLE XII.—*continued.*

S Herculis.

*	1	3	4	5	6	7	8	9	11	17	18	19	24	25	29	4A	$\frac{5}{4}\alpha_0$	Σ	Adopted
1	*	28	56	57	52	51	7	0	0	0	0	0	0	0	0	252	+·01	−·08	−·1
3	28	*	41	39	33	33	0	0	0	0	0	0	0	0	0	174	−·25	−·06	−·4
4	56	41	*	104	92	95	28	1	15	0	0	0	0	0	0	436	−·12	·00	−·2
5	57	39	104	*	133	127	76	32	56	0	0	2	0	0	0	626	+·04	+·06	·0
6	52	33	92	133	*	118	77	38	58	0	0	4	0	0	0	605	+·04	+·08	·0
7	51	33	95	127	118	*	74	33	54	0	0	6	0	0	0	591	+·01	+·07	·0
8	7	0	28	76	77	74	*	65	75	11	11	28	17	9	3	488	+·50	+·14	+·6
9	0	0	1	32	38	33	65	*	59	8	9	22	13	7	0	300	+·36	+·23	+·5
11	0	0	15	56	58	54	75	59	*	5	4	22	8	2	0	412	+·19	+·19	+·3
17	0	0	0	0	0	0	11	8	5	*	6	8	6	6	0	50	+·05	+·38	+·4
18	0	0	0	0	0	0	11	9	4	6	*	6	12	9	1	58	+·02	+·38	+·3
19	0	0	0	2	4	6	28	22	22	8	6	*	12	6	4	168	−·08	+·23	+·1
24	0	0	0	0	0	0	17	13	8	6	12	12	*	8	3	104	−·01	+·29	+·2
25	0	0	0	0	0	0	9	7	2	6	9	6	8	*	1	52	+·24	+·32	+·5
29	0	0	0	0	0	0	3	0	0	0	1	4	3	1	*	48	−·16	+·08	−·2

T Draconis.

*	*a*	*b*	*c*	*d*	*e*	*f*	*g*	4A	$\frac{5}{4}\alpha_0$	Σ	Adopted
a	*	77	84	84	61	24	6	336	−·09	+·10	−·1
b	77	*	85	85	59	23	11	340	+·38	·00	+·3
c	84	85	*	106	80	43	26	440	+·08	+·07	·0
d	84	85	106	*	80	43	26	424	+·16	+·05	+·1
e	61	59	80	80	*	22	18	352	−·09	+·07	−·1
f	24	23	43	43	22	*	17	172	+·48	+·02	+·4
g	6	11	26	26	18	17	*	104	−·21	+·10	−·2

R Cygni.

*	1	2	3	4	5	6	7	10	11	13	14	4A	$\frac{5}{4}\alpha_0$	Σ	Adopted
1	*	14	12	4	7	5	4	9	1	0	0	64	+·99	−·03	+1·0
2	14	*	80	51	56	45	31	64	23	0	0	364	+·39	−·10	+·3
3	12	80	*	48	79	52	41	94	56	5	9	476	+·10	−·09	·0
4	4	51	48	*	30	26	17	32	7	1	1	217	+·04	−·03	·0
5	7	56	79	30	*	41	50	78	51	11	14	417	−·04	−·10	−·1
6	5	45	52	26	41	*	21	50	19	0	0	259	−·25	−·04	−·3
7	4	31	41	17	50	21	*	35	19	2	1	221	−·19	−·06	−·3
10	9	64	94	32	78	50	35	*	79	27	31	499	−·08	−·08	−·2
11	1	23	56	7	51	19	19	79	*	25	29	309	−·30	−·10	−·4
13	0	0	5	1	11	0	2	27	25	*	27	120	−·05	−·16	−·3
14	0	0	9	1	14	0	1	31	29	27	*	124	+·18	−·21	·0

TABLE XII.—*continued.*

χ Cygni.

•	1	2	3	5	10	14	15	16	22	23	24	25	26	4A	$\frac{5}{4}a_0$	Σ	Adopted
1	*	49	50	37	14	31	6	3	1	1	0	0	0	212	−·16	−·29	− ·5
2	49	*	60	48	26	40	6	4	0	0	0	0	0	284	+·15	−·34	− ·2
3	50	60	*	46	24	39	6	4	0	0	0	0	0	272	+·09	−·32	− ·3
5	37	48	46	*	29	45	7	4	8	8	0	0	0	236	−·29	−·28	− ·6
10	14	26	24	29	*	36	13	6	14	14	0	0	0	212	−·32	−·20	− ·5
14	31	40	39	45	36	*	16	11	18	18	0	0	0	268	+·10	−·29	− ·2
15	6	6	6	7	13	16	*	20	19	19	3	2	5	144	−·09	−·04	− ·2
16	3	4	4	4	6	11	20	*	15	14	0	1	3	100	−·15	−·05	− ·2
22	1	0	0	8	14	18	19	15	*	56	30	30	33	256	−·08	+·33	+ ·2
23	1	0	0	8	14	18	19	14	56	*	28	28	31	256	−·10	+·30	+ ·2
24	0	0	0	0	0	0	3	0	30	28	*	28	29	118	+·59	+·55	+1·1
25	0	0	0	0	0	0	2	1	30	28	28	*	28	117	+·49	+·55	+1·0
26	0	0	0	0	0	0	5	3	33	31	29	28	*	129	+·45	+·55	+1·0

S Cygni.

•	*c*	*d*	*e*	*f*	*g*	*k*	*l*	4A	$\frac{5}{4}a_0$	Σ	Adopted
c	*	16	11	16	16	0	1	64	−·02	+·12	+·1
d	16	*	15	52	53	33	35	276	+·04	+·11	+·1
e	11	15	*	28	28	14	15	112	+·12	+·11	+·2
f	16	52	28	*	65	46	48	328	+·28	+·09	+·3
g	16	53	28	65	*	46	48	328	−·24	+·16	−·1
k	0	33	14	46	46	*	45	260	+·24	+·09	+·3
l	1	35	15	48	48	45	*	256	−·11	+·14	·0

T Cephei.

•	*d*	*f*	*g*	*h*	*l*	*m*	*n*	4A	$\frac{5}{4}a_0$	Σ	Adopted
d	*	107	116	96	94	134	126	673	+·39	−·10	+·2
f	107	*	107	33	33	74	74	428	+·38	−·07	+·3
g	116	107	*	58	58	93	98	530	+·22	−·05	+·1
h	96	33	58	*	125	81	83	520	+·24	−·11	+·1
l	94	33	58	125	*	82	84	496	−·10	−·05	−·2
m	134	74	93	81	82	*	146	610	−·50	+·01	- ·5
n	126	74	98	83	84	146	*	611	−·22	−·04	−·3

S Cephei.

•	3	4	9	10	12	13	14	15	16	17	18	19	4A	$\frac{5}{4}a_0$	Σ	Adopted
3	*	23	9	25	23	2	21	0	3	4	1	0	111	+·16	−·12	·0
4	23	*	9	24	22	2	19	0	3	4	0	0	106	+·28	−·14	+·1
9	9	9	*	18	18	6	14	0	7	5	4	0	90	+·21	−·10	·0
10	25	24	18	*	50	18	37	8	6	19	17	1	223	−·31	−·05	−·4
12	23	22	18	50	*	42	43	20	10	28	35	10	301	−·32	−·01	−·4
13	2	2	6	18	42	*	14	29	5	20	37	17	208	+·25	−·07	+·1
14	21	19	14	37	43	14	*	6	9	17	13	3	196	+·42	−·15	+·2

TABLE XII.—*continued.*

S Cephei—*continued.*

	3	4	9	10	12	13	14	15	16	17	18	19	4A	$\frac{5}{4}a_0$	Σ	Adopted
15	0	0	0	8	20	29	6	*	3	8	22	10	128	+·56	−·09	+·4
16	3	3	7	6	10	5	9	3	*	3	1	0	50	+·41	−·08	+·3
17	4	4	5	19	28	20	17	8	3	*	21	5	134	−·26	−·06	−·4
18	1	0	4	17	35	37	13	22	1	21	*	14	184	+·01	−·06	−·1
19	0	0	0	1	10	17	3	10	0	5	14	*	76	+·64	−·06	+·5

S Cephei.

*	*c*	*e*	*g*	*h*	*k*	*l*	4A	$\frac{5}{4}a_0$	Σ	Adopted
c	*	80	84	84	36	53	444	−·19	+·06	−·1
e	80	*	137	137	90	106	696	+·26	−·02	+·3
g	84	137	*	144	96	113	696	−·02	+·03	·0
h	84	137	144	*	96	113	660	+·20	−·02	+·2
k	36	90	96	96	*	66	384	−·26	+·06	−·2
l	53	106	113	113	66	*	451	−·45	+·08	−·3

R Cassiopeiæ.

*	1	2	3	4	6	7	8	9	12	14	15	16	17	4A	$\frac{5}{4}a_0$	Σ	Adopted
1	*	20	21	20	4	1	3	15	1	2	0	0	0	88	−·14	−·22	−·3
2	20	*	29	28	10	7	10	23	1	6	0	0	0	134	−·16	−·18	−·3
3	21	29	*	34	13	8	12	22	4	9	0	0	0	152	−·36	−·13	−·4
4	20	28	34	*	16	12	13	24	3	10	0	0	0	160	+·11	−·20	·0
6	4	10	13	16	*	27	22	13	12	20	1	0	0	138	+·12	−·03	+·1
7	1	7	8	12	27	*	23	11	9	20	2	0	1	121	+·28	−·04	+·3
8	3	10	12	13	22	23	*	12	9	25	9	6	8	162	−·15	+·04	−·1
9	15	23	22	24	13	11	12	*	2	8	0	0	0	130	−·29	−·12	−·4
12	1	1	4	3	12	9	9	2	*	9	0	0	0	50	−·10	+·03	·0
14	2	6	9	10	20	20	35	8	9	*	12	9	11	151	+·15	·00	+·2
15	0	0	0	0	1	2	9	0	0	12	*	9	11	76	+·59	·00	+·6
16	0	0	0	0	0	0	6	0	0	9	9	*	9	52	−·16	+·11	−·1
17	0	0	0	0	0	1	8	0	0	11	11	9	*	68	−·25	+·11	−·1

R Cassiopeiæ.

*	*g*	*h*	*k*	*l*	*n*	*o*	*p*	*q*	*r*	*s*	4A	$\frac{5}{4}a_0$	Σ	Adopted
g	*	48	48	46	38	11	1	0	0	0	208	+·39	+·01	+·4
h	48	*	75	76	73	45	10	2	4	0	333	+·04	+·02	+·1
k	48	75	*	84	77	48	14	0	3	0	349	+·09	+·01	+·1
l	46	76	84	*	90	61	28	0	16	0	416	−·04	+·01	·0
n	38	73	77	90	*	73	54	21	38	15	479	−·10	·00	−·1
o	11	45	48	61	73	*	61	30	46	24	416	−·30	−·01	−·3
p	1	10	14	28	54	61	*	39	53	33	336	+·10	−·10	·0
q	0	2	0	0	21	30	39	*	35	30	224	+·40	−·13	+·3
r	0	4	3	16	38	46	53	35	*	31	280	−·10	−·06	−·2
s	0	0	0	0	15	24	33	30	31	*	133	−·36	−·04	−·4

94. There is one obvious test of the validity and accuracy of the corrections thus obtained to the adopted magnitudes of the comparison stars. For many of the variables there are two independent series of observations: one set (N) with the numbered comparison stars and another (L) with the lettered comparison stars. Do the two results for the magnitudes of such stars as are common to the two series agree?

95. The answer is given in the following table, XIII.

The first row gives the letter-designation of the comparison star and the second row its number, taken from the first column of Table XI.

The row L gives the adopted (Harvard) magnitude for the "letter" series.

The row N−L gives the correction to L to obtain the magnitude originally adopted for the "number" series. This difference is given instead of N itself in order to exhibit more clearly the independence of the two series of observations.

The row *l*−L gives the correction to L obtained from the "letter" series of observations.

The row *n*−L gives the correction to L obtained from the "number" series. It is, of course, the sum of *n*−N and N−L.

TABLE XIII.

T Cassiopeiæ.

—	*e* 6	*f* 8	*g* 7	*l* 9	*n* 17	*p* 13	Mean
L	7·9	8·2	8·5	9·8	10·5	11·3	9·4
N−L	·0	·0	−·2	+·2	+·3	−·3	·00
l−L	+·1	+·1	·0	−·2	+·3	−·6	−·05
n−L	+·1	−·1	−·2	·0	+·1	−·3	−·07
n−*l*	·0	−·2	−·2	+·2	−·2	+·3	−·02

S Cassiopeiæ.

—	*b* 1	*c* 2	*g* 6	*k* 13	*l* 12	*m* 10	*n* 16	*o* 15	Mean
L	7·0	7·3	8·8	9·8	10·1	10·4	10·8	11·1	9·4
N−L... ...	·0	−·3	+·2	+·4	+·3	·0	+·1	−·2	+·06
l−L... ...	+·3	+·2	−·1	+·1	·0	−·3	·0	−·3	−·01
n−L	+·1	+·1	+·2	+·6	+·5	−·1	+·3	+·1	+·23
n−*l*	−·2	−·1	+·3	+·5	+·5	+·2	+·3	+·4	+·24

The star 1 was only observed on eight nights, and 2 on twelve nights.

Table XIII.—*continued.*

R Aurigæ.

—	*a* 3	*e* 4	*f* 7	*g* 6	*k* 25	*m* 12	Mean
L	6·2	8·2	8·8	9·3	10·3	11·1	9·0
N—L	—·1	—·1	+·4	+·1	—·6	—·2	—·08
l—L	+·2	—·2	+·2	+·2	—·3	—·2	—·02
n—L	+·2	—·1	—·1	·0	—·5	—·3	—·13
n—*l*	·0	+·1	—·3	—·2	—·2	—·1	—·12

R Ursæ Majoris.

—	*a* 1	*h* 2	*n* 3	*o* 7	*p* 8	*q* 9	*r* 11	*s* 17	*t* 19	Mean
L	5·9	8·2	9·8	9·9	10·5	11·0	11·5	12·0	12·5	10·1
N—L	+ ·6	+·7	+·1	—·3	+·1	—·2	—·4	—·9	—·4	—·08
l—L	+1·2	+·6	·0	—·2	—·2	+·1	—·3	—·1	—·1	+·11
n—L	+ ·8	+·5	·0	—·2	·0	—·2	—·2	—·3	—·2	+·02
n—*l*	— ·4	—·1	·0	·0	+·2	—·3	+·1	—·2	—·1	—·09

T Ursæ Majoris.

—	*e* 1	*f* 2	*g* 4	*h* 6	*k* 5	*l* 8	*m* 9	*n* 16	*o* 15	*q* 14	Mean
L ...	8·0	8·3	8·8	9·2	9·8	10·4	10·7	11·3	11·7	12·3	10·0
N—L ...	—·4	—·4	—·1	+·2	—·5	·0	—·4	—·1	—·9	—·8	—·34
l—L ...	—·1	—·1	+·2	·0	·0	+·2	·0	+·1	—·3	—·1	—·01
n—L ...	—·3	—·4	—·1	—·3	—·4	—·3	—·7	—·3	—·7	—·7	—·42
n—*l* ...	—·2	—·3	—·3	—·3	—·4	—·5	—·7	—·4	—·4	—·6	—·41

S Ursæ Majoris.

—	*a* 1	*b* 3	*c* 2	*f* 4	*g* 5	*k* 15	*l* 13	*m* 12	Mean
L	6·6	7·0	7·3	8·5	8·8	9·7	10·1	10·6	8·6
N—L... ...	—·6	·0	+·1	+·1	+·2	+·1	·0	+·3	+·03
l—L... ...	·0	+·1	+·1	·0	+·1	—·1	—·2	·0	·00
n—L	—·2	·0	—·1	·0	+·2	+·2	+·2	+·3	+·08
n—*l*	—·2	—·1	—·2	·0	+·1	+·3	+·4	+·3	+·08

Table XIII.—*continued.*

S Boötis.

—	*a* 1	*c* 3	*f* 5	*h* 8	*m* 10	Mean
L	7·4	8·4	9·7	10·6	12·0	9·6
N−L	+·2	+·1	+·3	−·1	−·5	·00
l−L	+·3	·0	·0	+·1	−·2	+·04
n−L	+·3	+·1	+·1	·0	−·5	·00
n−*l*	·0	+·1	+·1	−·1	−·3	−·04

R Camelopardi.

—	*b* 1	*c* 3	*e* 2	*g* 9	*k* 8	Mean
L	8·4	9·0	9·8	10·8	11·2	9·8
N−L	−1·3	−·3	−·4	−·4	−·5	−·58
l−L	−·1	+·3	+·1	·0	·0	+·06
n−L	−·6	−·3	−·6	−·4	−·5	−·48
n−*l*	−·5	−·6	−·7	−·4	−·5	−·54

R Draconis.

—	*a* 1	*f* 3	*h* 8	*k* 6	*s* 21	*q* 17	Mean
L	6·9	8·3	9·1	9·4	10·7	12·0	9·4
N−L	−·2	+·1	−·4	−·6	·0	−·1	−·20
l−L	−·1	·0	+·1	·0	+·2	·0	+·03
n−L	−·5	−·3	−·3	−·4	−·1	−·2	−·30
n−*l*	−·4	−·3	−·4	−·4	−·3	−·2	−·33

S Cephei.

—	*g* 14	*h* 12	Mean
L	9·8	10·2	10·0
N−L	−·3	+·4	+·05
l−L	·0	+·2	+·10
n−L	−·1	·0	−·05
n−L	−1	−·2	−·15

Table XIII.—*continued.*

R Cassiopeiæ.

—	*g* 1	*h* 2	*k* 3	*l* 4	*n* 8	*o* 14	*p* 15	*q* 17	Mean
L	6·7	7·2	7·5	8·2	9·4	9·9	10·5	11·0	8·8
N—L... ...	+·7	+·5	+·6	+·1	+·1	−·4	−·5	+·2	+·16
l—L	+·4	+·1	+·1	·0	−·1	−·3	·0	+·3	+·06
n—L... ...	+·4	+·2	+·2	+·1	·0	−·2	+·1	+·1	+·11
n—*l*	·0	+·1	+·1	+·1	+·1	+·1	+·1	−·2	+·05

96. Now looking for a moment at the last star alone, *R Cassiopeiæ*, the agreement is very good, the row $n-l$ being nearly constant in value; and we see from the row N−L that the adopted magnitudes of the stars were very different for the two series. The same may be said of *R Draconis* and of *R Camelopardi*, and indeed of most of the stars. Take *h* and *k* in the series for *T Ursæ Majoris* for instance. The L magnitudes were adopted as 9·2 and 9·8, while the N magnitudes were 9·4 and 9·3, which actually inverts the order of adopted brightness; and yet the corrections (*n*) are sensibly the same as the corrections (*l*). There is a constant difference; but allowing for this the two sets of corrections agree.

97. We may perhaps consider this constant difference before proceeding further. It arises from two sources.

First, there is a mean difference, shown in the row N−L, between the two series of originally adopted magnitudes. It is easier to fix the relative magnitudes of a set of stars than the mean magnitude of the set; and no doubt the mean magnitude of the L series is to be preferred, being a revision of that of the N series.

Secondly, each set of corrections, *l* and *n*, is affected with an arbitrary constant. The equations from which these corrections are derived are not independent (see § 87), and to solve them an arbitrary value must be assumed for one of the unknowns. The assumption has been made generally so as to keep the mean correction as small as possible. It will be seen that the mean of the *l*−L row is always less than ±0·1, though not always less than ±0·05; and it must be remembered that Table XIII. does not include all the stars, but only those common to the two sets; and, further, that a weighted mean is preferable to the simple mean given.

98. As regards the mean for *n*−N, which can be inferred from the difference of the means for *n*−L and N−L, there is this additional circumstance to explain why it is sometimes large (*e.g.* for *S Cassiopeiæ* $n-N=+\cdot23-\cdot06=+\cdot17$). Only a few of the "number" stars could at first be identified certainly with the "letter" stars (the complete identification was only made during a special visit to Rousdon in 1903 September), and from these few the best assumption possible was made to make the *n* and L scales agree. With fuller knowledge these assumptions were seen to be

sometimes sensibly in error. But it is of course quite easy to apply a constant difference to all the magnitudes; and in cases where the evidence seemed clear the following corrections were applied in the column "*Correction Stars*" to the "number" series of observations.

T Ursæ Majoris	+·4
R Camelopardi	+·6
R Draconis	+·3
R Cassiopeiæ	−·2

99. With the completer identification shown in Table XIII. it appears that the following additional corrections should be applied to the "number" series to make them comparable with the "letter" series:

For	*S Cassiopeiæ*	−·2
	R Ursæ Majoris	+·1
	S Ursæ Majoris	−·1
and for	*R Cassiopeiæ*	+·2

the former correction being based on insufficient information and being erroneous.

100. Returning now to the individual corrections, if we subtract from the rows N−L and $n-l$ the mean value of each (for each variable of course), and arrange the results according to the value of N−L, we get the following set of values of $n-l$ (Table XIV.):

TABLE XIV.

N−L.	Mean $n-l$.	No. of Cases.
+·8 to +·4	−·05	6
+·3 to +·1	+·04	28
·0	·00	9
−·1 to −·3	−·00	18
−·4 to −·8	−·09	12

101. This shows that the magnitude originally adopted has no sensible influence on the observations. Such a result was to be expected because of the care taken to exclude such influence (see § 22). The tables of adopted magnitudes were never allowed in the observatory at all in order that the estimations might be unbiassed. If any recollection of the lists can also be avoided, this safeguard should be complete, and it might seem improbable, or even impossible, to remember the magnitudes of such a miscellaneous and numerous collection of stars. Still the memory plays curious tricks at times, and it is satisfactory to have actual evidence that no knowledge of the adopted magnitudes has sensibly affected the observations.

102. It remains to express in numerical form the evidence that the corrections found are not accidental, from the agreement of the two sets. Treating each set of corrections as purely accidental errors we can find the mean error of each set, and then compare it with the mean error of their difference. For a complete investigation we must weight each residual according to the number of observations; but the much less laborious process of giving each residual unit weight will give an approximate result sufficient for our purpose.

From Table XIII. we get the following residuals for $l-L$ (excluding *S Cephei*):

Value ...	−·6	−·3	−·2	−·1	·0	+·1	+·2	+·3	+·4	+·6	+1·2	Total
No. of cases ...	1	6	7	10	19	13	7	5	1	1	1	71

whence the mean residual is found to be ±·16. [A similar investigation, shown in Table XIV. below, for all the residuals of Table XI. (in Table XIII. we only have the well-observed stars common to the two series), gives ±·17 as the mean of 142 residuals, sensibly the same as from Table XI.]

103. Similarly, if in Table XIII. we correct $n-L$ by its mean value for each star, the n series of stars gives for the same set of corrections to L

Value	−·5	−·4	−·3	−·2	−·1	·0	+·1	+·2	+·3	+·4	+·5	+·8	Total
No. of cases	1	1	7	8	10	15	16	5	5	1	1	1	71

whence the mean residual is found to be ±·16. Now if these residuals are purely accidental, then the mean of their differences should be $\pm 16 \times \sqrt{2} = \pm 23$, whereas we find the values of $n-l$ (corrected) to be as follows:

Value	−·4	−·3	−·2	−·1	·0	+·1	+·2	+·3	+·4	Total
No. of cases ...	1	6	9	10	15	19	7	4	0	71

and the mean residual is only ±·13, instead of ±·23.

104. It seems clear, then, that Mr. Grover attributes magnitudes to the comparison stars differing systematically from those found at Harvard. The differences are often small, but cannot be treated as negligible. The following Table XIV. shows the number of corrections to Harvard of different values for the *lettered* stars only—*i.e.* in cases where a good series of adopted values was available throughout:

Table XIV.

Value of correction ...	−·6	−·5	−·4	−·3	−·2	−·1	·0	+·1	+·2	+·3	+·4	+·5	+·6	+1·2
No. of cases	1	2	2	10	14	24	27	27	14	15	3	1	2	1

—*i.e.* out of 143 cases in all, sixty-five require a correction greater than 0·1, and thirty-seven a correction greater than 0·2.

105. There are, of course, well-known causes to which such systematic corrections may be assigned.

First, the *colour* of the stars (see § 28). With highly coloured stars a systematic

difference in estimation by different observers, or by the same observer with different instruments, excites no surprise ; and doubtless a small effect of the kind exists in all cases. An excellent illustration of the effect of colour is afforded by the observations made on *S Cephei* at Harvard in 1897 (*Harvard Annals*, vol. xxxvii. (1), p. 88). The estimates of different observers on the same night range over two whole magnitudes, and may be attributed to differences of colour vision. Again, the same observer (Mr. WENDELL), observing with both telescope and finder, obtains results differing by as much as 0·7, which may be set down as due to the "Purkinje phenomenon" (see note to § 35).

Secondly, the *position in the field of view.* Reference has already been made to this point (§§ 62–77), and no very definite conclusions were reached, but it must be remembered as a possible cause of discrepancy.

Thirdly, there are minor causes of a more spurious nature—as, for instance, this. When two stars, *a* and *b*, differ only slightly in magnitude and are both considerably brighter or fainter than the variable, the same difference is often recorded for both (see §§ 69 and 71).

This, of course, has the effect of unduly approximating the inferred magnitudes of these particular stars. In many cases this tendency is automatically corrected in the whole series of observations. Thus if we have three stars, *a*, *b*, *c*, of which *a* is 0·5 brighter than *b*, and *b* 0·5 brighter than *c*, then when *a* and *b* are recorded together *b* will be made rather too bright, and when *b* and *c* are recorded *b* will be made rather too faint, and hence, on the whole, *b* will come out correctly. But in some cases this compensation fails, and we get spurious corrections to Harvard ; but that these can only be of minor importance is shown by the fact that when the whole series of comparison stars is altered, as in the change from "number" stars to "letter" stars, we still get sensibly the same corrections.

106. The following questions thus arise :

(A) What magnitudes should be adopted for the comparison stars to give the best accordance with the Harvard series ? At first sight it would seem that to secure consistency between observations of different observers all of them should use the same adopted values for the comparison stars. If this view is adopted the column headed "Deduced Magnitude" in the printed results which follow, together with the "Correction for Scale" only, should be used.

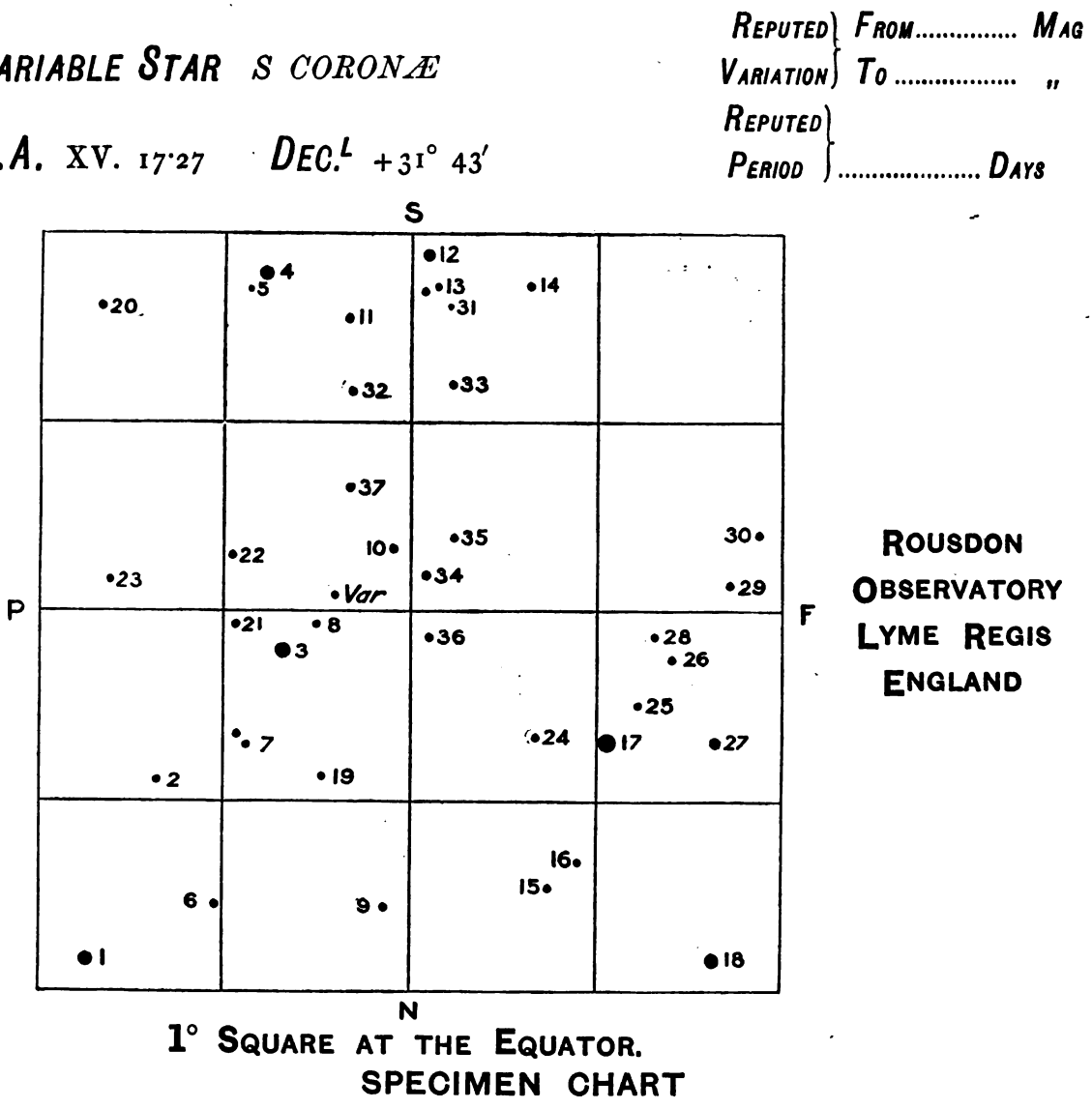
But if it is admitted that, while keeping the general scale the same, each observer will have slightly different magnitudes for the individual comparison stars, then we must add also the column headed "Correction Stars," and this seems to me the proper procedure. It has been adopted in forming the comparison with Harvard in the last column, but the other comparison can be readily obtained by subtracting the last column but one.

107. (B) It has been possible to determine these individual corrections from the present series of observations because of the number of comparisons (rough though

some of them may be) on each night. In the ordinary use of ARGELANDER's method, where only one or two comparisons with stars nearly equal to the variable in brightness are recorded, it would be difficult to get any such information. Does not this suggest that either (*a*) more comparisons should be made on each night, or (*b*) that extensive series of observations of the comparison stars themselves should always be made by each observer in order to detect his peculiarities as compared with the common standard adopted, whatever that may be ?

Identification of the Comparison Stars.

108. The method of charting the region of the variable at the commencement of the observations has been described in § 17. A specimen of the charts (for *S Coronæ*) is given below; but as they do not profess any great accuracy (although revised from


REPUTED VARIATION FROM ..... MAG
TO ..... ,,
REPUTED PERIOD ..... DAYS
VARIABLE STAR S CORONÆ
R.A. XV. 17·27 DEC.L +31° 43′
S
N
P
F
•1 •2 •3 •4 •5 6• 7• •8 9• •10 •11 •12 •13 •14 15• 16• 17• •18 •19 •20 •21 •22 •23 •24 •25 •26 •27 •28 •29 30• •31 •32 •33 •34 •35 •36 •37 •Var
ROUSDON
OBSERVATORY
LYME REGIS
ENGLAND

1° SQUARE AT THE EQUATOR.
SPECIMEN CHART

FIG. 4.

time to time), it was thought better not to multiply rough charts by publishing them. The substance of them is, however, given in the 3rd and 4th columns of Table XI. under the heading x, y, which represent "standard coordinates" referred to the variable as centre, in units of 5′. Since the side of each square in the charts represents 15′, we have simply to divide this space into three, then subdivide into tenths, and read off the coordinates to this scale on the charts. This was done during a visit to Rousdon in 1903 August, the measures being made on the actual charts in use at the Observatory.

These coordinates are in some ways preferable to R.A. and Decl., being directly comparable with measures on photographs. It may be possible in the near future to give the accurate coordinates (ξ, η) from photographic measures; but it would unduly delay the publication of these results to attempt to supply these measures now.

109. To convert x and y into differences of R.A. and declination the accurate formulæ are

if (α, δ) be the R.A. and Decl. of the comparison star
(A, D) „ „ „ variable

and

$$\tan q = \tan \delta \sec (\alpha - A)$$

then

$$x = [2{\cdot}8373040] \tan (\alpha - A) \cos q \sec (q - D)$$
$$y = [2{\cdot}8373040] \tan (q - D)$$

the number in square brackets being the logarithm of 687·5496, which is cosec 5′.

If $(\alpha - A)$, $(\delta - D)$ are expressed in seconds of time and arc respectively, and if we put

$$X = \tfrac{1}{240} (\alpha - A) \qquad Y = \tfrac{1}{3600} (\delta - D)$$

it is usually sufficient to write

$$y = Y + {\cdot}0003636 X^2 \sin 2D$$

and

$$\log x = \log X + (7{\cdot}1627 + \log \sin D) + \log (B - y)$$

where

$$B = [2{\cdot}8373] \cot D$$

And as a rough check we have

$$x = X \cos \delta \qquad y = Y$$

Results of the Observations.

110. The observations themselves are given in full, and will doubtless be used to best advantage in combination with series by other observers. But it seems desirable to give in a rather more condensed form the general results for each star. There is, however, at present no general consensus of opinion as to the precise form in which such results should be given. I gather from Mr. GROVER that Sir C. PEEK had some

preference for an actual continuous diagram in order of date, and such curves were prepared in MS. in order to judge of the expediency of reproducing them. But two considerations led to the abandonment of this project: firstly, the cost would have been considerable; and, secondly, I did not find that the extended curves gave an idea of the phenomena at a glance—certainly not so well as the method to be presently described. This disadvantage seemed to attach to several other methods adopted by different observers. We want to see at a glance

(*a*) The typical curve.

(*b*) The deviations from it.

And thus I was led to the procedure which is best described by an actual example. There is, of course, no new principle involved—if anything is new at all, it is only the mere arrangement of the figures; but this detail seems to me worthy of notice.

111. Let us take the first star *T Cassiopeiæ* as an example of the whole process; and as the process is practically independent of other observations, we need not assume any previous knowledge of the star's period. A glance at the observations indicates maxima and minima about the Julian dates:

Maxima.	Diff.	Maxima.	Diff.
2411205	445	2411378	452
1650	434	1830	422
2084	426	2252	453
2510	437	2705	462
2947	432	3167	440
3379	473	3607	459
3852	410	4066	436
4262	500	4502	428
4762	442	4930	439
5204		5369	

Whence a mean period of 444 days is indicated. There is a convenience in selecting a period divisible by 12, even if it is not exactly right, for we proceed to divide the period into twelve equal parts, which in this case are each 37 days. (But with shorter periods, such as 200 days, we must be more careful to get the period correct to a day, as will be seen presently.)

112. Starting then with any arbitrary Julian date, we divide up the whole series of observations into groups of 37 days each, and take the mean observed magnitude in each group. We then tabulate these magnitudes in rows of twelve as below:

Table XV.

Mean Magnitudes of T Cassiopeiæ for every 37 Days.

No. of Group.	1	2	3	4	5	6	7	8	9	10	11	12
Jul. Date.	0	37	74	111	148	185	222	259	296	333	370	407
891	...	...	...	...	9·2	8·3	8·3	8·2	7·6	7·8	8·2	9·3
1335	10·6	10·7	10·6	10·0	8·7	8·2	8·3	8·2	7·5	7·4	8·6	9·6
1779	10·4	11·1	10·7	9·2	8·8	8·6	8·3	8·0	7·6	7·7	8·3	9·5
2223	10·2	11·0	10·7	9·9	9·1	9·0	9·0	8·1	7·3	8·0	8·9	9·1
2667	11·0	11·3	10·1	9·2	8·7	8·7	8·6	8·4	7·4	7·5	8·5	9·2
3111	10·4	11·2	10·6	9·0	8·6	8·0	8·3	7·4	7·6	7·9	8·4	9·4
3555	10·0	11·0	10·7	9·6	9·0	8·5	8·3	8·3	7·7	8·2	(8·6)	9·0
3999	9·5	10·2	10·6	9·4	8·8	8·3	8·4	7·5	8·0	7·9	8·4	9·0
4443	9·4	9·8	9·9	9·2	8·7	8·7	8·7	8·2	7·9	7·8	8·9	9·6
4887	10·4	11·0	10·6	9·2	8·6	8·8	8·5	8·3	7·6	7·8	8·7	9·6
Mean	10·2	10·8	10·5	9·4	8·8	8·5	8·5	8·0	7·6	7·8	8·6	9·3

113. The tabulated magnitudes correspond *roughly* to the Julian dates formed by adding the numbers at the beginning of the row and top of the column in which the magnitude occurs. Thus looking along the line for 1335, until we come to the column headed 111, we find the magnitude 10·0, which thus corresponds roughly to the Julian date 1335+111=1446 (*i.e.* 2,411,446, the constant 2,410,000 having been subtracted throughout). The correspondence is only rough because the observations in this group were actually made on dates 1436 and 1442, and the mean requires a correction to date 1446. But for the formation of the preliminary light curve these corrections were neglected, and it was assumed that the mean magnitude for each group would correspond to the mean day.

114. Next the means of the columns were taken, excluding the top row, which is incomplete. For the group 3555+370, for which there were no observations, the value (8·6) was interpolated between 8·2 and 9·0 for the purpose of taking the mean.

115. Then, as a provisional check, the mean of each column was subtracted from the numbers above it to form residuals. These are only rough, being affected by the error above mentioned, but they are useful—

(1) As a rough check on the more accurate residuals to be presently formed.

(2) To show whether the assumed period requires correction. This point will be better illustrated later, and it need here only be noticed that if the period requires correction, then in drawing the mean curve we alter the interval (of 37 days) between each group by one-twelfth of the correction.

116. The next step is to plot the mean values of the columns at intervals of 37 days (or this interval corrected) and draw a smooth curve through the twelve points, the first of which is marked zero.

117. Then we take the dates of observation and read off the magnitudes from this curve to compare with the observations. A detached paper scale, where the hundred-day marks are left blank and can be filled in in pencil to suit the different numbers which fall on zero, enables us to do this work rapidly.

118. We can now form accurate mean residuals from each group, free from the error formerly mentioned. These are given in Table XVI.

Table XVI.

T Cassiopeiæ. Assumed period, 444 days.

Residuals for each Group of 37 Days, expressed in Tenths of a Magnitude.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Jul. Date.	0	37	74	111	148	185	222	259	296	333	370	407
891	...	...	...	...	+·2	−·3	−·2	+·2	·0	−·1	−·4	·0
1335	+ ·3	·0	+·4	+·5	·0	−·4	−·2	+·1	−·2	−·4	+·2	+·2
1779	+ ·1	+·3	+·3	−·1	·0	·0	−·2	·0	·0	−·3	−·3	+·1
2223	+ ·3	+·2	+·2	+·5	+·2	+·4	+·5	·0	−·3	+·2	+·3	−·2
2667	+ ·8	+·5	−·2	·0	·0	+·1	+·2	+·3	−·2	−·3	·0	·0
3111	+ ·3	+·5	+·1	−·3	−·4	−·5	−·2	−·5	·0	+·2	−·1	+·1
3555	− ·3	+·3	+·4	+·3	+·2	·0	−·2	+·2	·0	+·4	(·0)	−·4
3999	− ·7	−·6	+·3	+·2	·0	−·3	·0	−·6	+·3	·0	−·1	−·1
4443	− 1·0	−·9	−·5	−·2	−·1	·0	+·3	+·2	+·3	+·1	+·3	+·3
4887	+ ·2	+·3	+·4	·0	−·1	+·3	·0	+·1	−·1	·0	+·2	+·2
Mean	·00	+·07	+·16	+·10	·00	−·07	·00	·00	−·02	−·02	+·01	+·02
Mag. from curve	10·21	10·78	10·50	9·40	8·75	8·53	8·48	8·04	7·61	7·80	8·56	9·35

119. Now this table seems to me to give all the essential facts about the observations in very concise form. In the lowest row we have the magnitude from the mean curve, which can be corrected, if so desired, by the mean quantities given immediately above it. The residuals of the table enable us to follow at a glance any departures from this mean curve, due either to the star itself or to the observer's habits, for the period covered by the observations; and if it is wished to combine the material with other observations, it is in such a form that it can readily be made use of.

We proceed to give two illustrations of the way in which these residuals can be conveniently discussed.

120. In the first place, let us examine how far the residuals represent real anomalies in the brightness of the star. Some of them are so large (*e.g.* −10, −9, +8, &c.), and the same sign occasionally persists for so many consecutive groups (*e.g.* date 2223, groups 1 to 7), that a real departure from the mean curve is suggested. If so, Harvard observations should show the same thing when compared with the mean

Harvard curve. The two mean curves may be sensibly different, as we shall see, the difference being due to personal peculiarities of the observers; but it is an advantage of the suggested method of presentation of results that this systematic difference can be eliminated, and the residuals, if they represent any real vagary on the part of the star, should be directly comparable. Professor PICKERING gives mean curves for Harvard from which residuals for the above dates can be determined; but we have already formed, in the last column of the printed observations, a comparison with Harvard, and it is simpler to take the means of these differences for the groups as arranged. This is shown in the following table:

TABLE XVII.

T Cassiopeiæ.

Total Mean Corrections to Harvard for the same Groups as above.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Jul. Date.	0	37	74	111	148	185	222	259	296	333	370	407
891	...	...	...	...	−·3	−·6	−·2	−·2	−·8	−·8	−·7	−·3
1335	− ·1	− ·4	− ·6	− ·8	−·7	−·4	−·2	+·2	−·1	−·2	+·2	−·2
1779	− ·1	+ ·3	+ ·5	− ·3	−·2	·0	−·1	+·1	·0	+·1	−·1	+·1
2223	·0	− ·6	− ·6	− ·5	−·6	−·2	+·2	·0	−·2	+·1	...	...
2667	− ·1	+ ·4	− ·2	− ·4	−·5	−·1	+·4	+·6	+·1	−·2	−·1	−·6
3111	− ·5	+ ·1	− ·5	− ·6	·0	−·2	·0	−·4	·0	+·1	+·2	−·2
3555	−1·3	− ·8	− ·9	− ·5	−·2	−·3	−·3	−·2	−·1	+·2	...	−·6
3999	−1·8	−1·7	...	− ·4	−·3	−·3	−·1	−·6	+·1	−·2	·0	−·2
4443	−1·5	−1·6	−1·6	− ·7	+·5	+·4	+·3	+·1	+·2	−·2	+·2	−·2
4887	− ·4	− ·3	− ·6	−1·1	...	...	...	...	...	...	...	...
Mean	− ·6	− ·5	− ·6	− ·6	−·3	−·2	·0	·0	−·1	−·1	·0	−·3
Rousdon Mag.	10·2	10·8	10·7	9·5	8·8	8·4	8·5	8·0	7·6	7·8	8·6	9·4

121. The means of the columns show that there is a *systematic* correction to Harvard, *i.e.* the PEEK mean curve differs from the Harvard mean curve. But we can eliminate this systematic difference by subtracting the mean from each column. This is done in Table XVIII.

122. Table XVI. and Table XVIII. now allow us to test the reality of these residuals. If in the former we get a large residual, say −10; and if the star is really a full magnitude brighter, as this suggests; then both Harvard and Rousdon should show it, so that the "correction to Harvard" will be small. But if the residual is due to some vagary of the Rousdon observation not confirmed by Harvard, the "correction to Harvard" should be as large as the residual in Table XVI. Let us therefore arrange the residuals of Table XVI. according to their magnitude, and put under them the corresponding "corrections to Harvard," as below in Table XIX.:—

Table XVIII.

T Cassiopeiæ.

Residual Mean Correction to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Jul. Date.	0	37	74	111	148	185	222	259	296	333	370	407
891	...	...	...	...	·0	−·4	−·2	−·2	−·7	−·7	−·7	·0
1335	+ ·5	+ ·1	·0	−·2	−·4	−·2	−·2	+·2	·0	−·1	+·2	+·1
1779	+ ·5	+ ·8	+1·1	+·3	+·1	+·2	−·1	+·1	+·1	+·2	−·1	+·4
2223	+ ·6	− ·1	·0	+·1	−·3	·0	+·2	·0	−·1	+·2	...	...
2667	+ ·5	+ ·9	+ ·4	+·2	−·2	+·1	+·4	+·6	+·2	−·1	−·1	−·3
3111	+ ·1	+ ·6	+ ·1	·0	+·3	·0	·0	−·4	+·1	+·2	+·2	+·1
3555	− ·7	− ·3	− ·3	+·1	+·1	−·1	−·3	−·2	·0	+·3	...	− ·3
3999	−1·2	−1·2	...	+·2	·0	−·1	−·1	−·6	+·2	−·1	·0	+·1
4443	− ·9	−1·1	−1·0	−·1	+·8	+·6	+·3	+·1	+·3	−·1	+·2	+·1
4887	+ ·2	+ ·2	·0	−·5	...	...	...	...	...	...	...	...

Table XIX.

T Cassiopeiæ.

Rousdon minus Curve.	−10	−9	−7	−6	−5	−4	−3	−2	−1	0	+1	+2	+3	+4	+5	+8
Corresponding Rousdon minus Harvard	−9	−11	−12	−12	−10	+3	−7	+4	+3	+1	+5	+2	+ 5	0	+9	+5
	...	...	...	− 6	0	...	0	−1	+	+2	+1	−1	+ 6	−3	+6	...
	...	...	...	...	− 4	−2	−1	0	−7	−5	+1	0	+ 1	0	−2	...
	...	...	...	...	...	...	−4	−2	+2	−4	+2	+2	+ 8	0	+1	...
	...	...	...	...	...	−1	−1	−2	0	+1	−1	0	− 3	+3	+2	...
	...	...	...	...	...	...	+2	−1	+1	−2	+4	−3	+ 2	...	...	...
	...	...	...	...	...	−7	−1	0	...	0	+1	+1	+11	...	...	...
	...	...	...	...	...	−3	−1	−3	...	+6	...	+4	+ 1	...	...	...
	...	...	...	...	...	...	...	...	...	−1	...	−2	+ 3	...	...	...
	...	...	...	...	...	...	...	+2	...	+2	...	−2	+ 6	...	...	...
	...	...	...	...	...	...	...	0	...	−1	...	+1	+ 2	...	...	...
	...	...	...	...	...	...	...	...	...	+1	...	+2	+ 3	...	...	...
	...	...	...	...	...	...	...	...	...	0	...	+2	+ 2	...	...	...
	...	...	...	...	...	...	...	...	...	−7	...	+2	+ 1	...	...	...
	...	...	...	...	...	...	...	...	...	+1	...	+1	...	...	...	...
	...	...	...	...	...	...	...	...	...	+1	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	0	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	−1	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	−1	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	0	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	−3	...	...	...	...	...	...
Means...	− ·9	−1·1	−1·2	−·9	−·5	−·2	−·2	·0	+·1	·0	+·2	+·1	+·3	·0	+·3	+·5
Harvard minus Curve	−·1	+ ·2	+ ·5	+·3	·0	−·2	−·1	−·2	−·2	·0	−·1	+·1	·0	+·4	+·2	+·3

123. From inspection of the above table, it is clear that the Rousdon deviations are not confirmed by the Harvard observations; otherwise the lines "Rousdon minus Curve" and "Harvard minus Curve" would agree. The Rousdon deviations are practically reproduced in the line of "Means," which shows that they represent deviations just as much from the Harvard observations as from the PEEK mean curve, and must therefore be set down to the observer and not to the star. It is of interest to form a similar table for Harvard by inverting that just given. If we subtract from

TABLE XX.
T Cassiopeiæ.

Curve minus Harvard.	−7	−6	−5	−4	−3	−2	−1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9
Corresponding Rousdon minus Harvard	−7	−12	−12	−7	−7	−11	−4	−6	−9	−2	−1	+2	0	+4	+3	+11	+8
	−3	−7	−10	−4	−3	−2	−3	−2	−4	−1	0	...	+2	+6	...	...	...
	−2	−3	−5	−2	−1	−1	−1	−2	−3	−1	+2	+3	+8	...	...	...	...
	...	...	−3	−2	+2	0	−1	0	−1	−1	+4	+5	...	...	...	...	...
	...	...	...	0	+5	0	−1	0	−1	−1	+6	+9	...	...	...	...	...
	...	...	...	0	...	+1	−1	0	0	0	+6	...	...	...	...	..	...
	...	...	...	0	...	+1	+1	0	+1	0	...	...	...	...	...	...	...
	...	...	...	+1	...	+1	+1	+1	+1	+1	...	...	...	...	...	...	...
	...	...	...	...	...	...	+1	+1	+1	+2	...	...	...	...	...	...	...
	...	...	...	...	...	...	+2	+1	+1	+2	...	...	...	...	...	...	...
	...	...	...	...	...	...	+2	+2	+1	+4	...	...	...	...	...	...	...
	...	...	...	...	...	...	+2	+2	+2	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	+3	+2	0	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	+2	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	+3	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	+3	+6	+5	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	+2	...	0	...	...	...	...	...	...	...
Means	−4	−7	−8	−2	−1	−1	0	+1	0	+1	+3	+5	+3	+5	+3	+11	+8
Curve minus Rousdon ...	−3	+1	+3	−2	−2	−1	−1	−1	+1	+1	0	−1	+2	+1	+4	−3	+1

each column the number for "Rousdon minus Curve," we practically eliminate the Rousdon deviations, and we can arrange the results according to these new quantities found, which represent Harvard deviations from a mean curve. The result, however, is much the same. When the Harvard observations show deviations from a mean curve amounting to half a magnitude or more, no confirmation is forthcoming from the Rousdon observations.

124. We are thus led to the important conclusion that the apparent deviations from a mean curve are due to the observer and not to the star; or in other words the variations of brightness in the variable are perfectly regular, though the difficulties of observing introduce apparent deviations.

125. This conclusion is at variance with that arrived at by Professor PICKERING. On p. 121 of *Harvard Annals*, vol. xxxvii., part 1, he says: "Few, if any, variable stars of long period are perfectly regular in their changes in light. The period, brightness at maximum and at minimum, and form of light curve, all change from year to year. In many of them, however, these irregularities are so small that mean values

may be usefully studied." It is therefore put forward with some reserve, but at the same time it is to be remembered that Professor PICKERING had only one series of observations before him, whereas we have the advantage of two independent series. From one series alone the conclusion quoted from Professor PICKERING is the natural one to draw ; it is difficult to persuade oneself that such large deviations from a mean curve can be due to the observer. But directly we have two independent series we have a totally new check on these deviations.

126. Of course we must not hastily conclude, from this one instance, that variable stars always, or even generally, follow regularly periodic curves. The fair conclusions seem to be—

(*a*) That stars with truly regular variability exist. The regularity is such as to suggest phenomena depending on revolution under gravity, or some other accurately recurring cause.

(*b*) That cases of apparent deviation from regularity, before being accepted as real, should have the support of several independent series of observations. For if a single series can show apparent deviations which have no real foundation in fact, two independent series may, by mere coincidence, agree in such spurious testimony. It is clear that several observers may watch the same star without waste of work.

127. Returning to Table XVI. the second illustration of the use which may be made of the residuals therein given is to discuss any possible *seasonal* effect on the observations. For this purpose we arrange the residuals nearly in sets of 10; but since 37×10 days is $4\frac{3}{4}$ days greater than a year, after 4 sets of 10 we have advanced 19 days past the year end, more than half a group, and hence we drop one group ; and again another after 8 more sets of 10. The residuals thus appear as follows :

TABLE XXI.

T Cassiopeiæ.

Possible Seasonal Effect on the Observations.

I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.
+2	−3	−2	+ 2	0	−1	−4	0	+3	0
+4	+5	0	− 4	−2	+1	−2	−4	+2	+2
+1	+3	+3	− 1	0	0	−2	0	0	−3
−3	+1	+3	+ 2	+2	+5	+2	+4	+5	0
...	−3	+2	+ 3	−2	+8	+5	−2	0	0
+1	+2	+3	− 2	−3	0	0	+3	+5	+1
−3	−4	−5	− 2	−5	0	+2	−1	+1	−3
+3	+4	+3	+ 2	0	−2	+2	0	+4	(0)
−4	−7	−6	+ 3	+2	0	−3	0	−6	+3
0	−1	−1	−10	−9	−5	−2	−1	0	+3
+2	+3	+1	+ 3	+3	+2	+3	+4	0	−1
+3	0	+1	− 1	0	+2	+2	...	...	...
Mean 0	0	0	0	−1	+1	0	0	+1	0

There accordingly seems to be no sensible annual or seasonal effect.

128. Before proceeding to give the results for the other variables corresponding to Tables XVI. and XVIII. we will show how the true period may be determined from the residuals when the assumed period is in error. The period of *S Boötis* was at first assumed to be 270 days, and the first set of residuals obtained was as follows (Table XXII.). Glancing down the columns, we see that there are progressive changes

Table XXII.

S Boötis. Assumed period, 270 days.

Residuals for each Group of 22½ Days.

	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	22½	45	67½	90	112½	135	157½	180	202½	225	247½
1339	+1·0	+ ·1	− ·7	− ·9	−1·2	− ·8	− ·6	+ ·4	+ ·6	(+ ·8)	+1·1	+1·1
1609	+ ·8	− ·2	− ·6	−1·0	(−1·0)	−1·0	− ·5	− ·2	(+ ·6)	+1·5	+1.1	+ ·1
1879	·0	− ·2	− ·6	− ·7	−1·0	− ·7	− ·8	+ ·2	(+ ·4)	(+ ·5)	(+ ·7)	+ ·9
2149	(+ ·4)	− ·1	− ·2	− ·3	− ·5	− ·5	(+ ·3)	+1·0	+ ·6	+1·0	+ ·5	+ ·1
2419	(− ·2)	− ·4	− ·5	− ·9	−1·6	·0	+ ·3	+ ·9	+1·5	+1·3	+ ·6	+ ·2
2689	− ·5	− ·1	− ·2	− ·6	− ·3	− ·1	+1·1	+ ·3	+1·2	+ ·5	− ·1	− ·6
2959	− ·2	− ·2	+ ·1	+ ·1	(− ·1)	− ·3	− ·2	+ ·4	+ ·9	+ ·8	+ ·7	·0
3229	− ·1	+ ·1	+ ·1	+ ·1	+ ·5	+ ·3	+ ·2	(− ·2)	− ·5	− ·6	− ·2	·0
3499	− ·1	− ·2	− ·2	+ ·3	+ ·3	+ ·3	− ·3	− ·9	+ ·2	− ·2	− ·5	+ ·2
3769	− ·2	+ ·1	+ ·4	+ ·5	+1·0	(+ ·8)	+ ·6	(+ ·3)	·0	− ·3	− ·1	·0
4039	− ·2	− ·1	+ ·2	(+ ·4)	+ ·5	+ ·7	+ ·4	·0	− ·4	− ·2	− ·1	+ ·1
4309	(+ ·2)	+ ·3	+ ·6	+ ·7	+1·1	− ·1	(− ·6)	−1·0	− ·9	−0·9	− ·4	− ·3
4579	·0	+ ·7	(+ ·8)	+1·0	(+ ·6)	+ ·1	·0	− ·4	−1·2	−1·1	− ·8	− ·3
4849	− ·2	+ ·6	+1·0	+1·0	+ ·6	+ ·3	− ·2	(− ·8)	−1·4	−1·4	−1·3	− ·9
5119	− ·3	+ ·1	+1·0	(+1·0)	+1·0	+1·1	·0	−1·1	−1·3	− ·7	− ·5	− ·9
Mag. from Curve	9·0	8·9	9·3	10·1	11·0	12·1	12·6	12·7	12·0	10·8	9·9	9·3
1339+(4)	+2·0	− ·8	−2·6	−3·8	−5·3	−3·0	−1·3	+2·3	+3·7	+5·1	+4·0	+2·4
4039+(4)	− ·5	+1·6	+3·6	+4·1	+3·8	+2·1	− ·4	−3·3	−5·2	−4·3	−3·1	−2·3
Difference	−2·5	+2·4	+6·2	+7·9	+9·1	+5·1	+ ·9	−5·6	−8·9	−9·4	−7·1	−4·7
Factor 0·86	−2·2	+2·0	+5·3	+6·8	+7·8	+4·4	+0·8	−4·8	−7·7	−8·1	−6·1	−4·0
$p-f$	+0·4	−0·3	−1·2	−1·7	−2·0	−1·6	−0·6	+0·6	+1·9	+2·1	+1·5	+0·9
Ratio = Cor. to Period	−5·5	−6·7	−4·4	−4·0	−3·9	−2·8	−1·3	−8·0	−4·1	−3·9	−4·1	−4·4

in the residuals, the changes being from negative to positive for columns 2 to 8 (max. to min.) and positive to negative for columns 9 to 1 (min. to max.). The change is

due to error in the assumed period, which produces an apparent progressive change in epoch. Geometrically the effect is illustrated by drawing a sinuous curve, A B C D, and displacing it horizontally through a small space, Aa = Bb = Cc = Dd. If we compare a series of magnitudes following actually the curve a b c d with an assumed

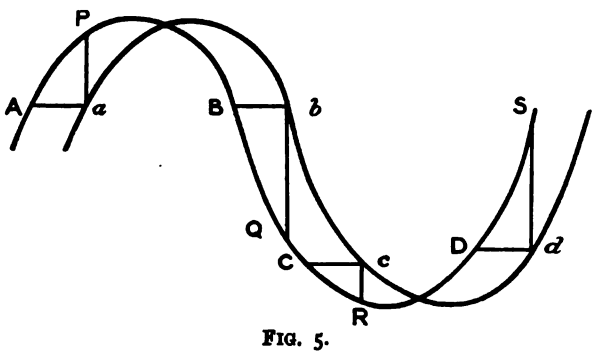


FIG. 5.

curve A B C D, we get positive residuals, Pa, Sd, on the ascending branches, and negative residuals, bQ, cR, on the descending branches. And the magnitude of the residual depends on the slope of the curve; in fact, when the displacement is small the ratio of the residual to the constant displacement becomes what is ordinarily denoted by $\frac{dy}{dx}$.

129. A good approximation to the value of $\frac{dy}{dx}$ can be obtained from the figures already before us, without making any special investigation. In Table XXII., looking at the line "Magnitude from Curve," the difference between these numbers for columns 1 and 3 may be taken to represent $\frac{dy}{dx}$ for column 2; the difference for columns 2 and 4 for column 3, and so on; the quantity required for any column being proportional approximately to the difference between the preceding and following columns, which we shall denote henceforth by the symbol $p-f$. Let us see what this procedure gives us in the case of a simple sine curve. Suppose the magnitude of the variable to be represented by

$$y = \text{A} \sin 2\pi x/\text{N},$$

where x is the number of days elapsed since a maximum, and N is the true period in days. And suppose we erroneously assume a period N+n, and therefore find the magnitudes at intervals of (N+n)/12 days, for a number of consecutive periods. In any column of the table let the middle magnitude be A sin α; so that below it we have

$$\text{A} \sin(\alpha+\theta), \quad \text{A} \sin(\alpha+2\theta) \ldots \text{A} \sin(\alpha+r\theta),$$

and above it we have

$$\text{A} \sin(\alpha-\theta), \quad \text{A} \sin(\alpha-2\theta) \ldots \text{A} \sin(\alpha-r\theta),$$

where $\theta = 2\pi n/N$, and there are $2r+1$ terms in all. The sum of corresponding pairs above and below is thus

$$2A \sin a (\cos\theta + \cos 2\theta + \ldots + \cos r\theta)$$
$$= A \sin a \operatorname{cosec} \tfrac{1}{2}\theta [\sin (r+\tfrac{1}{2})\theta - \sin \tfrac{1}{2}\theta].$$

And thus the mean of the whole column is

$$\frac{A \sin a \sin (r+\frac{1}{2})\theta}{(2r+1)\sin \frac{1}{2}\theta} = A \sin a \text{ when } \theta \text{ is small.}$$

The mean for the preceding column is got by writing $a-\phi$ instead of a; and for the following column by writing $a+\phi$ instead of a; where ϕ is nearly 30°, the accurate value being $2\pi(N+n)/12N$. Thus:

$$p-f = \frac{-2A \cos a \,.\, \sin\phi \,.\, \sin (r+\frac{1}{2})\theta}{(2r+1)\sin\frac{1}{2}\theta}$$
$$= -A \cos a \text{ when } \theta \text{ is small.}$$

Our object is to find n fr m the residuals, which change progressively. If we compare two residuals at equal distances from the middle, say q periods from the middle, their difference is

$$D = A \sin (a+q\theta) - A \sin (a-q\theta) = 2A \cos a \sin q\theta$$

and dividing this difference by $p-f$ we get, when θ is small,

$$D/(p-f) = -2 \sin q\theta = -2q \,.\, 2\pi n/N$$
$$\text{Hence } -n = +\frac{D}{p-f} \times \frac{N}{2\pi \times 2q}.$$

If, instead of two single residuals, we form two groups and compare their means, $2q$ is the interval between the middles of the groups. When n is not small compared with N, the approximate formula is not sufficiently accurate, and we must either use the rigorous formulæ, or make a second approximation with a better assumed value of the period. The latter proceeding is to be preferred, since the rigorous formulæ are only applicable to a simple "sine" curve.

130. From the value for n obtained in the last paragraph the adopted procedure will now be intelligible. Recurring to Table XXII. we form the sum of five early groups of residuals in the line 1339+(4), denoting the first line and four following lines: and again the sum of five late groups in the line 4039+(4). The divisor 5 necessary to convert these sums into means is included in the factor applied to the difference, viz. $N/4\pi q$. In our case N=270 days approximately, and $q=5$, so that $N/4\pi q = 4{\cdot}3$; and dividing by 5 to convert sums into means we have 0·86, which is the factor applied. The quantity $p-f$ is defined above as the excess of the magnitude (from the curve) of the preceding column over that of the following; and the ratio of

the two lines then gives the required correction to period. The determinations from the separate columns have different weights because of the variation in the divisor. To form a weighted mean we may weight according to the values of this divisor, and then the procedure becomes—

Multiply by the values of $p-f$ and divide the sum of the products by the sum of the squares of $p-f$.

Thus, in the case of *S Boötis*, we should get

$$-\frac{2{\cdot}2\times 0{\cdot}4+2{\cdot}0\times 0{\cdot}3+5{\cdot}3\times 1{\cdot}2+\text{ \&c.}}{(0{\cdot}4)^2+(0{\cdot}3)^2+(1{\cdot}2)^2+\text{ \&c.}}=-3{\cdot}9 \text{ days},$$

and the correct period should thus be taken as 266·1 days.

131. Returning now to Table XVI. we may find the correction to the assumed period of 444 days for *T Cassiopeiæ* by this method. The figures are

TABLE XXIII. (Addendum to Table XVI.)

T Cassiopeiæ.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
1335+(3)	+ 1·5	+1·0	+ ·7	+ ·9	+ ·2	+ ·1	+ ·3	+ ·4	− ·7	− ·8	+ ·2	+ ·1
3555+(3)	− 1·8	− ·9	+ ·6	+ ·3	·0	·0	+ ·1	− ·1	+ ·5	+ ·5	+ ·4	·0
Difference	− 3·3	−1·9	− ·1	− ·6	− ·2	− ·1	− ·2	− ·5	+1·2	+1·3	+ ·2	− ·1
Factor 3·5	−11·6	−6·7	− ·4	−2·2	− ·7	− ·4	− ·7	−1·8	+4·2	+4·6	+ ·7	− ·4
$p-f$	− 1·4	−0·3	+1·4	+1·8	+0·9	+0·3	+0·5	+0·9	+0·2	−1·0	−1·6	−1·6
Cor. to Period	+ 8·3	...	−0·3	−1·2	−0·8	...	−1·4	−2·0	...	−4·6	−0·4	+0·3

The weighted mean is +0·4 days, but the different columns are not very consistent, and this suggests that we have some other disturbing cause. The corrected period of 444·4 days agrees well with CHANDLER'S period of 445 days (3rd Cat. *A.J.* No. 379). Taking the mean maximum of the Rousdon observations to be at 3111+308, *i.e.* at Julian date 2413419, and comparing with CHANDLER'S maximum 2404515, the difference in 20 periods is 8904 days, which gives a mean period of 445·2 days. The evidence for a regular period of 445 days is thus very consistent.

132. We proceed to give tables for the other stars corresponding to Table XVI. for *T Cassiopeiæ*. A few words of explanation may be repeated here for convenience. In Table XXIV. the Julian date to which any residual applies is found by adding to 2410000 two numbers; viz. the number in the first column and in the same row as the residual; and the number in the top row but one and in the same column as the residual. Thus, for Julian date 2410000+4114+208=2414322, we have the residual +8. The actual magnitude observed at Rousdon for this date is got by adding this residual to the "magnitude from curve" shown at the bottom of the column, viz. 10·95; so that at J.D. 2414322 the magnitude observed was 11·75. For the method of finding the "correction to period" at the bottom of the Table, see § 130.

TABLE XXIV.

S Cassiopeiæ. Assumed period, 624 days.

Residuals for each Group of 52 Days; expressed in Tenths of a Magnitude.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Jul. Date.	0	52	104	156	208	260	312	364	416	468	520	572
0370... ...	...	...	...	...	...	...	...	−·2	−·4	−·3	−·2	−·5
0994... ...	(−·3)	−·1	−·4	−·7	− ·9	− ·1	−·3	−·4	0	+·3	+·5	+·1
1618... ...	−·1	+·1	(+·2)	+·3	+ ·8	+ ·7	−·4	+·1	+·3	+·5	+·3	+·1
2242... ...	+·1	+·1	+·1	+·1	− ·2	− ·7	+·2	+·5	·0	+·3	+·6	+·9
2866... ...	+·8	−·2	+·5	−·7	−1·0	−1·0	−·4	·0	- ·2	−·2	+·2	·0
3490... ...	+·4	(+·4)	+·5	(+·3)	+ ·2	+ ·8	+·3	+·1	+·1	−·2	−·3	+·1
4114... ...	−·3	·0	+·4	+·7	+ ·8	+ ·1	−·1	−·3	−·4	−·5	−·3	+·2
4738... ...	+·1	·0	−·2	+·4	+ ·9	+ ·5	+·5	+·2	−·1	−·1	−·4	−·5
Mean ...	+·10	+·04	+·16	+·06	+ ·09	+ ·04	−·03	·00	−·09	−·03	+·05	+·05
Mag. from Curve ...	12·40	12·40	12·40	11·91	10·95	9·57	8·37	8·60	9·30	10·29	11·40	12·27
0994+(2) ...	− ·3	+ ·1	− ·1	− ·3	− ·3	− ·1	− ·5	+ ·2	+·3	+ 1·1	+ 1·4	+ 1·1
3490+(2) ...	+ ·2	+ ·4	+ ·7	+ 1·4	+ 1·9	+ 1·4	+ ·7	·0	− ·4	− ·8	− 1·0	− ·2
Difference ...	+ ·5	+ ·3	+ ·8	+ 1·7	+ 2·2	+ 1·5	+ 1·2	− ·2	− ·7	− 1·9	− 2·4	− 1·3
Factor 8·3 ...	+4·2	+2·5	+6·6	+14·1	+18·3	+12·5	+10·0	−1·7	−5·8	−15·8	−19·9	−10·8
$p-f$... ...	...	...	...	...	+ 2·3	+ 2·6	+ 1·0	− ·9	−1·7	− 2·1	- 2·0	...
Corrn. Period	...	...	...	...	+ 8·0	+ 4·8	+10·0	+1·9	+3·4	+ 7·5	+ 9·9	...

133. The residuals from "numbered" comparison stars have been diminished by 0·2. See § 99.

It is not suggested that the star remains of constant brightness during the period covered by groups 1 to 3; merely that the Rousdon observations fail to detect any change when the star is very faint. This is not the case with other stars at even fainter minima, but happens with one or two (such as *R Lyncis*), where the variable is practically the faintest star visible in the field.

Groups affected in this way have been excluded in determining the "correction to period." The weighted mean of the correction is +6·7 days, which gives a true period of 624+6·7=630·7 days. CHANDLER'S formula (3rd Cat. of Variable Stars, *A.J.* No. 379) is

$$2401583+610{\cdot}5\,E+50\sin(10^\circ E+50^\circ)$$

For the mean epoch of the observations E=19, and thus a maximum is due at

$$2401583+11599{\cdot}5-50\sin 60^\circ=2413139{\cdot}2$$

The maximum according to the Rousdon observations falls at 2412866+328=241,3194, which would agree better with the formula if the periodic term were omitted.

The correction to period determined above is practically derived from the period

between E=17 and E=21. For these values of E the maxima according to the formula fall at 2411929·4 and 2414354·3, giving an interval of 2424·9 days for four periods, or a mean period of 606·2 days, which differs sensibly from the 630·7 above found. To obtain this last value from the formula we must alter the periodic term in some way, and especially we must increase the coefficient, for with the coefficient 50 the greatest interval between two consecutive maxima is the greatest value of

$$610{\cdot}5+50\,[\sin\theta-\sin(\theta+10^\circ)]$$

which is $610{\cdot}5+100\sin 5^\circ$, or 619·2 days. But we cannot discuss this point without reference to other observations. CHANDLER used maxima in 1843 and 1863–93; and any new formula must thus agree with the old one at these periods. Tentatively we may suggest some such modification as

$$2401590+615\,E+75\sin(12^\circ E+90^\circ)$$

which compares with the observations and the old formula as follows:

Date.	E	Epoch of Maximum.			Period.		
		Old.	New.	N−O.	Old.	New.	N−O.
1843 ...	−12	2394210	2394150	−60	...	...	...
1863 ...	0	2401621	2401665	+44	616	615	−1
1873 ...	+ 6	2405293	2405303	+10	608	600	−8
1883 ...	+12	2408918	2408910	− 8	602	606	+4
1895 ...	+19	Rousdon 2413194	2413225	+31	Rousdon 630	628	−2

TABLE XXV.

S Persei. Assumed period, 840 days.

Residuals for each Group of 70 Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	70	140	210	280	350	420	490	560	630	700	770
1252 ..	...	...	...	...	...	...	...	...	...	...	−3	−1
2092 ...	−3	−6	−4	−1	+1	+1	+2	+2	+5	2	+3	+3
2932 ...	+2	0	0	0	−1	0	−3	−1	+1	+ 5	+6	+4
3772 ...	+5	+5	+7	+3	−2	−3	−1	−2	−5	−11	−4	+1
4612 ...	0	+4	−3	−3	+2	+4	0	−2	−2	0	−3	−9
Mean ...	+0·10	+0·08	0·00	−0·03	0·00	+0·05	−0·05	−0·08	−0·03	−0·10	−0·02	−0·04
Mag. from Curve	8·57	8·67	8·87	9·13	9·37	9·58	9·73	9·70	9·45	9·03	8·65	8·54

134. The columns which afford the best corrections to period suggest a shortening of about 60 days—to 780 days say; but the whole period of observation is too short to give a good determination. Moreover there are indications of other periods interfering with that above adopted; one for instance of 16×70 days. Let us arrange the residuals in eight groups of 2×70 days, by taking the mean of consecutive pairs. Then we get the following result:

TABLE XXVI.

S Persei. Assumed period, 1120 days.

Group.	1	2	3	4	5	6	7	8
Julian Date.	0	140	280	420	560	700	840	980
2127	−5	−3	+1	+2	+4	+3	+1	0·
3247	−1	−2	+3	+5	+5	+5	−3	−2
4367	−7	−2	+2	−3	+3	−1	−1	−6
Mean	−4	−2	+2	+1	+4	+2	−1	−3

giving a distinct range of about 0·7 or 0·8 magnitude. Now if we subtract the means of the columns from each member, we get the following series: −1 −1 −1 +1 0 +1 +2 +3 +3 0 +1 +4 +1 +3 −2 +1 −3 0 0 −4 −1 −3 0 −3; which seems to suggest another wave, of period about equal to the whole extent of the observations.

135. On first thoughts, this perhaps suggests an "interference" effect between the two periods of 12×70 days and 16×70 days; but I do not see how to get such an effect from the combination of two waves. The well-known result is a progressive change in amplitude of the mean wave: while here we have an apparent bodily shifting of the wave up and down. It almost seems as though we must admit three independent waves of periods 840, 1120, and 3360 days approximately; and semi-amplitudes 0·6, 0·4, and 0·4 magnitude. Assuming the values of the components at intervals of 70 days to be as follows, in tenths of a magnitude,

First wave −4 −4 −3 0 +3 +5 +6 +5 +3 −2 −5 −6: then repeat

Second wave −4 −4 −3 −1 +1 +2 +2 +3 +4 +4 +3 +2 0 −2 −2 −3: then repeat

Third wave −1 −1 −1 0 0 0 +1 +1 +1 +2 +2 +2 +3 +3 +3 +3 +3 +3 +3 +3 +2 +2 +2: then repeat with reversed sign

we get, on combining the three, the following comparison with Rousdon and Harvard,

Table XXVII. S Persei.

Comparison with Formula at Intervals of 70 Days.

Epoch.	Formula.	Rousdon.	Harvard.	Epoch.	Formula.	Rousdon.	Harvard.	Epoch.	Formula.	Rousdon.	Harvard.
2092	8·2	+·1	+·1	3212	9·3	·0	−·2	4332	8·9	+·2	−·2
2162	8·2	−·1	−·1	3282	9·5	+·1	·0	4402	8·3	−·4	−·1
2232	8·4	·0	−·1	3352	9·7	−·3	·0	4472	8·1	+·2	+·2
2302	9·0	·0	−·1	3422	9·8	−·2	·0	4542	8·2	+·4	+·2
2372	9·5	·0	·0	3492	9·8	−·2	−·2	4612	8·5	+·1	·0
2442	9·8	−·1	−·3	3562	9·3	+·2	−·1	4682	8·6	+·5	·0
2512	10·0	−·1	−·5	3632	9·0	+·3	·0	4752	8·7	−·2	−·3
2582	10·0	−·1	−·5	3702	9·0	−·1	−·2	4822	9·1	−·3	−·4
2652	9·9	+·1	−·4	3772	9·2	−·1	−·3	4892	9·5	+·1	−·3
2722	9·5	−·3	−·3	3842	9·2	·0	−·2	4962	9·7	+·3	+·1
2792	9·1	−·1	−·2	3912	9·2	+·3	−·3	5032	9·7	·0	·0
2862	8·9	−·1	−·3	3982	9·3	+·1	−·1	5102	9·5	·0	—
2932	9·0	−·2	−·4	4052	9·4	−·2	·0	5172	9·1	+·3	—
3002	8·8	−·1	−·3	4122	9·4	−·1	+·1	5242	8·5	+·5	—
3072	8·9	−·1	−·3	4192	9·4	+·2	+·1	5312	8·2	+·2	—
3142	9·1	·0	−·2	4262	9·2	+·3	+·1	5382	8·0	−·4	—

Table XXVIII. R Aurigæ. Assumed period, 456 days.

Residuals for each Group of 38 Days.

Group ...	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date ...	0	38	76	114	152	190	228	266	304	342	380	418
1019	+ ·4	− ·3	+ ·1	·0	+ ·1	− ·1	·0	− ·4	(− ·3)	(− ·3)	− ·2	+ ·1
1475	− ·2	+ ·5	+ ·1	− ·4	− ·4	− ·5	+ ·1	− ·4	− ·6	− ·9	− ·1	+ ·4
1931	+ ·2	+ ·4	+ ·2	− ·1	·0	− ·4	− ·4	− ·8	(− ·6)	(− ·4)	− ·2	− ·1
2387	·0	− ·2	+ ·2	+ ·2	− ·2	− ·4	− ·5	+ ·1	+ ·4	+ ·8	+1·2	+ ·1
2843	·0	·0	+ ·2	− ·4	− ·3	− ·3	− ·3	+ ·3	+ ·7	+ ·8	+ ·4	− ·6
3299	+ ·1	·0	− ·4	− ·2	− ·1	− ·1	+ ·2	+ ·8	(+ ·6)	(+ ·5)	+ ·4	− ·1
3755	− ·1	+ ·7	+ ·4	·0	+ ·3	+ ·7	− ·4	− ·5	− ·6	− ·4	− ·3	+ ·3
4211	+ ·2	+ ·3	− ·5	+ ·1	+ ·4	+ ·1	·0	+ ·3	(+ ·3)	(+ ·2)	+ ·2	− ·2
4667	− ·9	− ·4	·0	− ·1	·0	+ ·1	+ ·1	+ 1·0	(+ ·8)	+ ·5	− ·2	+ ·1
5123	+ ·4	+ ·4	− ·3	·0	+ ·3	+ ·4	+ ·2	− ·3	—	—	—	—
Mean ...	+0·01	+0·14	0·00	−0·09	+0·01	−0·05	−0·10	+ 0·01	+0·08	+0·09	+0·13	0·00
Mag. from Curve	9·83	9·55	8·28	7·40	8·17	9·28	10·61	11·81	12·77	13·02	11·75	10·23
1019+(3)...	+ ·4	+ ·4	+ ·6	− ·3	− ·5	−1·4	− ·8	− 1·5	−1·1	− ·8	+ ·7	+ ·5
3299+(3)...	− ·7	+ ·6	− ·5	− ·2	+ ·6	+ ·8	− ·1	+ 1·6	+1·1	+ ·8	+ ·1	+ ·1
Difference...	−1·1	+ ·2	−1·1	+ ·1	+1·1	+2·2	+ ·7	+ 3·1	+2·2	+1·6	− ·6	− ·4
Factor 3·6...	−4·0	+ ·7	−4·0	+ ·4	+4·0	+7·9	+2·5	+11·2	+7·9	+5·8	−2·2	−1·4
$p-f$ ...	+ ·7	+1·6	+2·2	+ ·1	−1·9	−2·4	−2·5	− 2·2	−1·2	+1·0	+2·8	+1·9
Corr. to Per.	−5·7	+0·4	−1·8	...	−2·1	−3·3	−1·0	− 5·1	−6·6	+5·8	−0·8	−0·7

136. The weighted mean correction to period is −1·8 days, giving as the period 456−1·8=454·2 days. In *A.J.* 379 CHANDLER'S period is 460·2 days. Taking the mean Rousdon maximum as 2410000+3299+113=2413412, and comparing with CHANDLER'S 2401462, we get a difference of 11950 days for 26 periods, which gives a mean of 459·6 days. The different values might be reconciled if the period is gradually shortening.

TABLE XXIX.

U Orionis. Assumed period, 372 days.

Residuals for each Group of 31 *Days.*

Group ...	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date...	0	31	62	93	124	155	186	217	248	279	310	341
0234	...	...	+1·1	+ ·7	+ ·2	+ ·1	...	...	...	...	(+ ·1)	+ ·1
0606	− ·5	+ ·2	+ ·6	+ ·5	+ ·5	+ ·1	...	...	...	...	− ·6	− ·8
0978	− 1·8	−1·1	− ·5	+ ·1	− ·2	− ·2	...	...	...	...	(− ·7)	− ·4
1350	− ·6	− ·2	+ ·2	+ ·4	+ ·4	+ ·1	...	...	...	...	+ ·4	+ ·5
1722	− ·3	− ·2	+ ·1	+ ·1	+ ·1	+ ·8	...	...	...	+ ·7	− ·3	−1·1
2094	− 1·1	− ·2	− ·3	− ·4	− ·1	...	...	...	...	...	+ ·2	+ ·6
2466	+ ·6	+ ·4	+ ·4	+ ·6	+ ·2	...	...	...	...	...	+ ·5	+ ·3
2838	− ·1	− ·1	+ ·1	− ·1	+ ·1	...	...	...	...	...	·0	+ ·4
3210	+ ·6	+ ·3	·0	+ ·6	+ ·2	...	...	...	...	+ ·9	+ ·3	− ·1
3582	+ ·7	+ ·5	+ ·2	·0	− ·2	...	...	...	...	− ·5	− ·5	(+ ·1)
3954	+ ·7	·0	− ·2	·0	...	...	...	...	...	+ ·2	− ·3	+ ·2
4326	+ ·4	·0	− ·2	−1·0	...	...	...	...	·0	+ ·2	+ ·1	+ ·3
4698	+ ·3	− ·2	− ·6	− ·9	...	...	...	...	− ·1	+ ·3	+ ·2	− ·1
5070	+ ·5	− ·3	− ·6	(− ·6)	...	...	...	...	− ·2	·0	+ ·2	(·0)
Mean ...	− 0·05	−0·07	+0·02	+0·00	+0·12	+0·18	...	...	−0·01	+0·26	+0·02	−0·01
Mag. from Curve	8·40	7·00	7·14	7·71	8·53	9·35	(10·06)	(10·63)	(11·06)	11·14	10·64	9·77
0606+(4)...	− 4·3	−1·5	+ ·1	+ ·7	...	...	...	...	...	...	− ·4	−1·2
3582+(4)...	+ 2·6	·0	−1·4	−2·5	...	...	...	...	...	...	− ·3	+ ·5
Difference...	+ 6·9	+1·5	−1·5	−3·2	...	...	...	...	...	...	+ ·1	+1·7
Factor 1·5...	+10·4	+2·2	−2·3	−4·8	...	...	...	...	...	...	+ ·2	+2·6
p—*f* ...	+ 2·8	+1·3	−0·7	−1·4	...	...	...	...	...	...	+1·4	+2·2
Corr. Per....	+ 3·7	+1·7	+3·3	+3·4	...	...	...	...	...	...	+0·1	+1·2

137. The weighted mean of the correction to period is +2·4 days, giving 374·4 days as the proper value. CHANDLER gives 375. Comparing again the Rousdon mean maximum 2410000+2838+39=2412877 with CHANDLER'S 2409877, we get an

interval of 3000 days for 8 periods, which gives exactly 375·0 days. The consistency of this testimony is striking.

Table XXX.

R Lyncis. Assumed period, 384 days.

Residuals for each Group of 32 Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	32	64	96	128	160	192	224	256	288	320	352
2294	...	...	...	...	...	...	...	+2·0	+ 1·2	+ ·6	·0	− ·7
2678	− 1·2	− ·8	− ·6	+ ·2	+ ·8	+2·4	+·9	+ ·5	+ ·6	+ ·6	− ·3	− ·6
3062	− ·5	− ·8	− ·1	+ ·7	+ ·7	+ ·9	−·5	− ·3	+ ·2	+ ·3	·0	+ ·1
3446	− ·1	− ·4	+ ·3	0	+ ·5	+ ·2	0	− ·2	+ ·1	− ·1	+ ·1	+ ·3
3830	+ ·3	+ ·4	+ ·6	(+·4)	(+·1)	− ·1	−·7	− ·8	− ·5	·0	+ ·1	+ ·7
4214	+ ·9	+1·1	+1·8	+ ·2	−1·0	+ ·6	+·2	+ ·2	− ·2	− ·2	+ ·1	+ ·5
4598	+ ·7	+ ·9	(+·7)	(+·5)	+ ·3	+ ·1	+·4	+ ·1	− ·6	− ·9	+ ·1	+ ·4
4982	+ ·5	+ ·9	+ ·2	(+·3)	+ ·5	− ·2	+·4	− ·2	− 1·0	− ·6	+ ·1	+ ·5
5366	+ ·5	...	...	...	...	...	...	...	...	...	...	...
Mean	+ ·14	+ ·19	+ ·41	+0·33	+0·27	+0·56	+·10	+ ·16	− ·03	− ·04	+ ·03	+ ·15
Mag. from Curve	9·94	11·00	12·00	12·00	12·00	12·00	10·29	9·80	8·72	8·00	8·13	8·90
2678+(2)	− 1·8	...	...	...	...	...	...	·0	+ ·9	+ ·8	− ·2	− ·2
4214+(2)	+ 2·1	...	...	...	...	...	...	+ ·1	− 1·8	− 1·7	+ ·3	+1·4
Difference	+ 3·9	...	...	...	...	...	...	+ ·1	− 2·7	− 2·5	+ ·5	+1·6
Factor 5·1	+19·9	...	...	...	...	...	...	+ ·5	−13·8	−12·8	+2·6	+8·2
$p-f$	− 2·1	...	...	...	...	...	...	+1·6	+ 1·8	+ 0·6	−0·9	−1·8
Corr. Per.	− 9·5	...	...	...	...	...	...	+0·3	− 7·7	−21·3	−2·8	−4·6

138. As in the case of *S Cassiopeiæ* (see Table XXIV. and remarks), it is not suggested that the magnitude remains constant for groups 3, 4, and 5; but merely that the Rousdon observations fail to show any sensible change, the variable being the faintest star visible in the field.

The weighted mean correction to period is −6·2 days, making the corrected period 377·8. Chandler (*A.J.* 379) gives 380·0. Again comparing the Rousdon mean maximum 2410000+3830+301=2414131 with Chandler's 2405782, we get an interval of 8349 days for 22 periods, or a mean period of 379·5. It seems just possible that the period is slowly shortening.

Table XXXI.

R Ursæ Majoris. Assumed period, 300 days.

Residuals for each Group of 25 Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	25	50	75	100	125	150	175	200	225	250	275
0939	(·0)	(·0)	+ ·3	+ ·6	+ ·4	+ ·4	+ ·4	− ·2	− ·4	−1·0	−1·3	−1·3
1239	− ·5	− ·3	− ·1	− ·2	+ ·3	+ ·3	·0	+ ·1	+ ·3	+ ·3	+ ·1	+ ·2
1539	+ ·3	− ·1	+ ·1	+	+ ·3	(+·2)	+ ·1	+ ·4	+ ·5	(+·7)	+1·0	+1·2
1839	+ ·5	+ ·3	+ ·4	+ ·3	+ ·2	+ ·4	+ ·1	− ·2	− ·3	− ·2	+ ·5	− ·1
2139	− ·3	− ·6	− ·2	·0	·0	− ·1	(−·2)	− ·2	− ·1	+ ·1	+ ·5	+ ·3
2439	·0	− ·2	+ ·2	+ ·4	+ ·6	+ ·4	+ ·5	+ ·8	+ ·4	− ·3	− ·4	·0
2739	+ ·2	+ ·2	+ ·4	− ·2	+ ·1	+ ·4	+ ·2	+ ·7	·0	+ ·8	− ·1	− ·2
3039	− ·1	+ ·3	+ ·2	− ·1	− ·2	− ·4	− ·3	+ ·3	+ ·1	− ·8	−1·1	− ·1
3339	+ ·3	·0	·0	+ ·1	− ·5	− ·8	− ·2	− ·3	− ·5	−1·1	−1·1	− ·5
3639	− ·3	− ·1	+ ·1	− ·1	+ ·2	− ·1	− ·2	− ·1	− ·2	+ ·4	+1·1	+ ·2
3939	+ ·1	+ ·4	+ ·7	(+·5)	+ ·3	+ ·5	(+·5)	(+·5)	+ ·5	+1·0	+1·2	− ·3
4239	·0	+ ·1	+ ·1	+ ·2	+ ·1	+ ·1	+ ·1	+ ·2	− ·4	− ·3	·0	+ ·4
4539	− ·3	− ·2	− ·2	− ·3	− ·5	− ·1	+ ·1	+ ·4	+ ·1	+ ·7	+ ·9	+1·4
4839	+ ·7	+ ·4	+ ·1	·0	+ ·3	+ ·4	+ ·5	− ·1	+ ·1	+ ·4	+ ·1	+ ·3
5139	+ ·1	− ·4	− ·2	− ·2	− ·7	− ·5	− ·1	− ·1	+ ·2	+ ·6	+ ·6	(+·6)
Mean	+0·05	−0·01	+0·13	+0·08	+0·06	+0·07	+0·09	+0·15	+0·03	+0·09	+0·13	+0·14
Mag. from Curve	8·21	8·20	8·69	9·36	10·19	11·09	11·83	12·37	12·48	12·21	11·24	9·06
1239+(4)	·0	− ·8	+ ·4	+ ·7	+1·4	+1·2	+ ·5	+ ·9	+ ·8	+ ·6	+1·7	+1·6
3939+(4)	+ ·6	+ ·3	+ ·5	+ ·2	− ·5	+ ·4	+1·1	+ ·9	+ ·6	+2·4	+2·8	+2·4
Difference	+ ·6	+1·1	+ ·1	− ·5	−1·9	− ·8	+ ·6	·0	− ·2	+1·8	+1·1	+ ·8
Factor 1·1	+ ·7	+1·2	+ ·1	− ·6	−2·1	− ·9	+ ·7	·0	− ·2	+2·0	+1·2	+ ·9
$p-f$	+ ·9	− ·5	−1·2	−1·5	−1·7	−1·6	−1·3	− ·7	+ ·2	+1·2	+3·2	+3·0
Corr. Period	...	...	− ·1	+0·4	+1·2	+0·6	−0·5	...	...	+1·7	+0·4	+0·3

139. A correction of +·1 has been applied to the residuals for the "numbered" comparison stars as indicated in § 99.

The weighted mean correction to period is +0·4 days, making the corrected period 300·4 days. Chandler's formula (*A.J.* No. 379) is

$$2397951{\cdot}2+302{\cdot}1\,E+15\sin(10^\circ E+190^\circ)$$

and for the Rousdon observations E varies from about 44 to 57. When E=53, sin (10° E+190°)=sin 720°=0 and the formula thus gives a maximum at 2413962·5. The Rousdon mean curve gives 2413939+13 =2413952, indicating that the mean period of the formula is too large by 10·5/53=0·2 days only.

140. But the following maximum E=52, falls 302·1 + 15 sin 10°=304·7 days later according to the formula, which is sensibly different from the value 300·4 found from the Rousdon observations. It would suit the Rousdon observations better all round if the period, instead of being near a maximum, as the formula gives, were near a minimum; *i.e.* if the periodic term were about 150° in error. Thus, taking the coefficient of E in the periodic term to be 8° instead of 10°, then, when E=53, the formula gives a maximum at 2413948, only 4 days from Rousdon; and the preceding one is 301·2 days earlier; the next preceding 300·7 earlier, and so on. In fact, the mean period would agree well with that found at Rousdon. But the existence of this periodic term renders the determination of a single mean period less significant: it is better to make a series of determinations. For this purpose let us take the sums of successive groups of three and form the differences of each consecutive set, treating them in the usual way. It is perhaps not necessary to give the work at length, as similar cases are fully worked out for the next two stars, *T* and *S Ursæ Majoris*. The periods found are given in the following table in the column "Rousdon;" while under headings A and B are given the periods according to the formula on the two suppositions for the value of the coefficient of E in the periodic term:

TABLE XXXII.

R Ursæ Majoris.

E	A Coeff. 10°.	B Coeff. 8°.	Rousdon.	R−A.	R−B.
	d	d	d	d	
47	303·4	300·3	300·6	−2·8	+0·3
50	304·4	300·7	298·7	−5·7	−2·0
53	304·7	301·5	302·2	−2·5	+0·7
56	304·4	302·3	302·0	−2·4	−0·3

TABLE XXXIII.

T Ursæ Majoris. Assumed period, 256 days.

Residuals for each Group of 21⅓ Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	21	43	64	85	107	128	149	171	192	213	235
0325	...	...	...	...	...	...	+1·7	+1·0	+ ·3	+ ·6	·0	+ ·6
0581	·0	− ·2	(·0)	(+ ·2)	(+ ·3)	(+ ·5)	+ ·7	+ ·3	− ·7	·0	(+ ·2)	+ ·3
0837	+ ·1	·0	− ·5	− ·3	− ·4	+ ·2	+ ·4	−1·9	− ·5	− ·8	− ·3	− ·4
1093	− ·4	·0	·0	(+ ·4)	+ ·8	+1·4	+1·6	+ ·8	+ ·9	− ·1	− ·2	− ·6
1349	− ·1	− ·3	− ·1	− ·5	− ·1	+ ·4	− ·5	−1·0	− ·6	− ·3	+ ·2	− ·4
1605	+ ·1	− ·2	·0	+ ·1	+1·2	+1·2	+1·1	+ ·8	+ ·8	+ ·4	+ ·2	− ·3
1861	+ ·3	+ ·4	+ ·4	(+ ·6)	(+ ·8)	+1·0	+1·7	+1·2	+ ·4	·0	+ ·2	·0
2117	− ·4	− ·3	− ·6	− ·5	− ·6	− ·4	+ ·3	+ ·1	− ·2	− ·5	·0	− ·2

TABLE XXXIII—*continued.*

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	21	43	64	85	107	128	149	171	192	213	235
2373	− ·1	·0	+ ·4	+ ·8	+1·3	+2·3	+1·1	+ ·6	+ ·5	+ ·2	− ·3	− ·3
2629	(·0)	+ ·3	(+ ·3)	+ ·3	+ ·6	+1·4	+1·4	+1·3	+ ·6	·0	− ·7	− ·5
2885	− ·1	− ·3	(− ·2)	·0	+ ·4	+1·4	+1·2	− ·3	+ ·1	− ·2	− ·9	−1·0
3141	− ·6	− ·5	+ ·1	·0	+ ·2	+ ·9	+ ·9	+ ·2	+ ·2	+ ·2	(+ ·2)	+ ·2
3397	(·0)	− ·1	+ ·4	+ ·7	− ·1	+ ·2	− ·1	− ·2	·0	− ·1	·0	·0
3653	·0	+ ·5	+ ·2	+ ·8	+1·0	+1·3	+1·6	+ ·8	+ ·5	+ ·2	+ ·1	+ ·3
3909	+ ·5	(+ ·4)	+ ·3	(+ ·4)	+ ·6	− ·4	·0	(·0)	·0	+ ·1	− ·3	− ·1
4165	− ·2	+ ·1	+ ·7	·0	+ ·2	+2·2	− ·1	− ·3	+ ·1	+ ·4	+ ·5	·0
4421	− ·7	− ·6	− ·1	−1·0	− ·2	− ·4	− ·5	− ·8	− ·2	+ ·1	·0	− ·1
4677	− ·1	·0	− ·2	− ·4	− ·5	− ·9	− ·6	− ·8	− ·5	·0	·0	·0
4933	·0	+ ·1	(− ·2)	− ·5	− ·7	− ·6	−1·1	−1·0	− ·9	− ·5	(− ·4)	− ·4
5189	+ ·4	+ ·1	(·0)	·0	·0	+ ·1	·0	− ·9	− ·6	− ·2	(− ·1)	(− ·1)
Mean ...	−0·07	−0·03	+0·05	−0·06	+0·25	+0·62	+0·54	0·00	+0·01	−0·03	−0·08	−0·15
Mag. from Curve	10·80	11·77	12·50	12·91	12·42	11·12	9·33	7·93	7·57	8·02	8·75	9·80
0581+(4) ...	− ·3	− ·7	− ·6	− ·1	+1·8	+3·7	+3·3	−1·0	− ·1	− ·8	+ ·1	−1·4
4165+(4) ...	− ·6	− ·3	+ ·2	−1·9	−1·2	+ ·4	−2·3	−3·8	−2·1	− ·2	·0	− ·6
Difference ...	− ·3	+ ·4	+ ·8	−1·8	−3·0	−3·3	−5·6	−2·8	−2·0	+ ·6	− ·1	+ ·8
Factor 0·6 ...	− ·2	+ ·2	+ ·5	−1·1	−1·8	−2·0	−3·4	−1·7	−1·2	+ ·4	− ·1	+ ·5
p−*f*	−2·0	−1·7	−1·2	+0·1	+1·8	+3·0	+3·2	+1·8	−0·1	−1·2	−1·8	−2·1
Cor. Period	+0·1	−0·1	−0·4	−1·1	−1·0	−0·7	−1·1	−0·9	+1·2	−0·3	+0·1	−0·2

141. The mean correction to adopted period is −0·5 days, and thus the mean period deduced from these observations is 255·5 days. But this cannot be treated as a variable with a definite period. CHANDLER gives as the elements (Third Catalogue of Variables, *A.J.* 379)

$$2400705{\cdot}8+257{\cdot}2\,E+20\sin(9^\circ E+90^\circ)$$

and at the mean epoch of the Rousdon observations E is about 47; and $47\times9^\circ+90^\circ=360^\circ+153^\circ$. The interval between two maxima by CHANDLER'S formula at the mean epoch is thus approximately,

$$257{\cdot}2+20(\sin153^\circ-\sin144^\circ)=254{\cdot}4 \text{ days}$$

which is smaller than the value above obtained. But the process of finding a mean as above is only justified when the period is constant, or is changing uniformly, which is not the case if CHANDLER'S formula be correct.

142. For half a dozen periods, however, we may consider the change approximately uniform, and we may proceed to make a series of determinations of period. First

form the mean residuals for three consecutive periods as below, omitting the first two lines. While doing so we may correct all the columns for the error of the adopted curve as shown in the line of means, which is considerable in some cases.

TABLE XXXIV.

T Ursæ Majoris.

Means of Three Consecutive Periods.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	21	43	64	85	107	128	149	171	192	213	235
1093	·0	− ·1	− ·3	·0	− ·2	+ ·1	·0	− ·7	− ·1	− ·4	·0	− ·3
1861	+ ·1	·0	− ·2	+ ·2	+ ·2	·0	+ ·5	+ ·7	+ ·3	·0	+ ·2	·0
2629	·0	·0	+ ·1	+ ·5	+ ·5	+1·1	+ ·7	+ ·5	+ ·4	·0	− ·5	− ·4
3397	− ·1	·0	+ ·1	+ ·6	+ ·1	+ ·2	+ ·3	+ ·3	+ ·2	+ ·1	+ ·2	+ ·3
4165	·0	·0	+ ·2	− ·1	·0	− ·1	− ·7	− ·4	·0	+ ·2	+ ·2	+ ·1
4933	+ ·2	+ ·1	− ·2	− ·2	− ·7	− ·9	−1·1	− ·9	− ·7	− ·2	− ·1	·0
Corr. Mag. ...	10·7	11·7	12·6	12·9	12·6	11·7	9·9	8·0	7·6	8·0	8·7	9·6
p−*f*	−2·1	−1·9	−1·2	0·0	+1·2	+2·7	+3·7	+2·3	0·0	−1·1	−1·6	−2·0

143. If now we calculate the mean period from each consecutive pair of these in the same way as before, we get the following periods for comparison with CHANDLER'S formula :

TABLE XXXV.

T Ursæ Majoris.

E	Chandler's Period.	Rousdon.	R−C.
42	256·3	257·0	+0·7
45	255·0	257·7	+2·7
48	254·3	253·3	−1·0
51	254·1	254·1	0·0
54	254·6	254·9	+0·3
Mean	254·8	255·4	+0·5

144. This agreement is satisfactory. We may conclude :

(1) That CHANDLER'S formula is nearly correct.

(2) That the phenomena may be strictly periodic in character, although several waves may be combined. It is not claimed that strict periodicity is *established* by these few figures, but it is certainly suggested.

(3) Something of the character of the variation is shown, although the observations do not extend over a sufficient number of periods to show it completely. The columns numbered 5, 6, 7, 8 vary far more than the others, *i.e.* the variation is chiefly

on the *rise* from minimum to maximum. We are reminded of the fact that many regular variables pause on the rise to maximum. Has *T Ursæ Majoris* an intermittent pause? If the two phenomena are connected, we may get some light on the origin of both. But such discussions would take us beyond the scope of the present work, for to make them complete we must include other series of observations. It may be added that the similar means of three consecutive residuals for *R Ursæ Majoris* are more irregular and have not been thought worth printing.

(4) As regards the epoch of maximum when E = 47 Chandler's formula gives 2412803·3, while the Rousdon mean curve gives 2412629 + 170 = 2412799, practically perfect agreement.

Table XXXVI.

S Ursæ Majoris. Assumed period, 225 days.

Residuals for each Group of 18½ Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	18	37	56	75	93	112	131	150	168	187	206
0152	...	...	...	...	...	...	...	...	...	−·4	(−·4)	−·4
0377	−·1	+·1	−·5	− ·3	−·4	−·3	+1·0	(+·4)	−·2	−·5	−·2	−·4
0602	+·1	+·2	(·0)	− ·1	+·2	+·4	−1·6	−·1	+·2	−·1	+·2	+·5
0827	+·3	+·3	+·2	+1·0	+·6	+·5	+ ·9	+·3	+·3	+·4	+·3	−·5
1052	−·5	−·6	−·8	+ ·8	+·7	+·7	+ ·6	+·7	+·8	+·3	·0	+·2
1277	−·4	−·4	−·2	+ ·2	+·1	+·3	·0	+·3	−·1	−·4	−·1	−·4
1502	−·3	+·2	−·3	·0	−·1	+·2	+ ·9	+·6	+·2	−·2	·0	−·2
1727	−·2	·0	+·4	− ·2	·0	·0	+ ·9	+·6	−·1	+·2	·0	·0
1952	−·1	−·5	−·6	·0	−·1	+·4	+1·0	+·5	(+·6)	+·6	·0	−·5
2177	−·4	−·2	·0	+·2	+·5	+·2	+ ·1	−·2	−·2	+·1	−·5	−·1
2402	−·3	(−·2)	·0	·0	−·1	−·4	− ·2	−·1	−·2	·0	−·1	−·2
2627	+·1	+·3	−·2	+·6	+·3	·0	·0	·0	·0	−·1	−·2	·0
2852	−·3	−·1	−·2	−·1	(−·2)	−·3	− ·3	−·2	+·2	·0	(·0)	·0
3077	−·2	+·3	+·1	+·3	+·6	+·5	·0	·0	−·1	−·2	−·1	−·3
3302	·0	−·2	−·4	−·8	(−·7)	−·6	− ·2	+·2	+·2	+·2	·0	+·2
3527	−·4	−·3	−·7	−·6	−·6	·0	− ·8	−·4	·0	−·4	−·1	·0
3752	+·3	+·2	+·2	+·5	+·3	+·3	·0	+·1	+·1	+·5	+·2	−·1
3977	−·4	·0	−·5	−·3	+·1	+·5	− ·3	(−·2)	·0	+·1	+·3	−·2
4202	+·4	+·1	−·3	+·3	·0	+·3	·0	−·5	−·3	+·3	+·4	·0
4427	+·3	−·1	−·5	−·8	−·3	+·3	− ·7	−·4	−·2	−·1	+·1	+·2
4652	+·1	·0	(·0)	+·1	+·1	+·4	− ·4	−·1	+·1	+·2	·0	+·1
4877	+·4	+·5	+·4	+·4	+·5	−·1	− ·7	−·2	·0	−·6	−·4	−·1
5102	+·2	+·3	·0	−·5	+·3	·0	− ·1	−·1	+·2	+·1	+·5	+·2
5327	+·1	+·4	+·7	−·2	...	...	...	...	...	...	..	...
Mean	−·06	+·02	−·14	+·02	·00	+·15	+ ·01	+·05	+·07	·06	·00	−·09
Mag. from Curve	8·27	8·97	9·93	10·67	11·26	11·40	10·38	9·23	8·48	8·27	7·90	7·95

Chandler's formula is very definite, being based on observations going back to 1790, viz. :

$$2400586{\cdot}0+226{\cdot}1\,E+43\sin(5^{\circ}{\cdot}76\,E+181^{\circ}{\cdot}5).$$

We proceed therefore to make three determinations of period as follows :

Group.	1	2	3	4	5	6	7	8	9	10	11	12
0827+(4)	−1·1	− ·3	− ·7	+1·8	+1·3	+1·7	+3·3	+2·5	+1·1	+0·3	+ ·2	− ·9
1952+(4)	−1·0	− ·7	−1·0	+ ·7	+ ·4	− ·1	+ ·6	·0	+ ·4	+ ·6	− ·8	− ·8
3077+(4)	− ·7	·0	−1·3	− ·9	− ·3	+ ·7	−1·3	− ·3	+ ·2	+ ·2	+ ·3	− ·4
4202+(4)	+1·4	+ ·8	− ·4	− ·5	+ ·6	+ ·9	−1·9	−1·3	− ·2	− ·1	+ ·6	+ ·4
p−*f*	−1·1	−1·6	−1·7	−1·5	−0·8	+0·9	+2·3	+1·8	+1·0	+0·7	+0·4	−0·3
Correction to Period	− ·1	+ ·4	+ ·2	+1·1	+1·6	−2·6	−1·7	−2·0	−1·0	+0·6	−3·5	− ·3
	− ·4	− ·6	+ ·2	+1·5	+1·3	+1·0	−1·2	− ·2	− ·3	− ·9	+4·0	−2·0
	−2·7	− ·7	− ·8	− ·4	−1·6	+ ·3	− ·4	− ·8	− ·6	− ·6	+1·0	−3·7

145. The numbers in these three rows are not very consistent ; perhaps there is an actual change in the light curve which would account for this. Forming the weighted means for the three rows we get −0·6, −0·2, −0·7 respectively. Now the corresponding values of E for the means of the four groups are 48, 53, 58, 63, which give maxima at

$$2411481{\cdot}4,\ 2412603{\cdot}7,\ 2413717{\cdot}6,\ 2414826{\cdot}9.$$

Hence we have the following comparison between the formula and the Rousdon observations :

Table XXXVII.

S Ursæ Majoris.

Determinations of Period.				Determinations of Maximum.			
E	Formula.	Rousdon.	R—F.	E	Formula.	Rousdon.	R—F.
48–53	1122·3/5 = 224·5	224·4	−0·1	...			
					2412604	2412597	−7
53–58	1113·9/5 = 222·8	224·8	+2·0	...			
					2413718	2413722	+4
58–63	1109·3/5 = 221·9	224·3	+2·4	...			

which may be considered a fairly satisfactory accordance, though some correction to the formula would improve it.

TABLE XXXVIII.

S Boötis. Assumed period, 267 days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	22	44	67	89	111	133	156	178	200	222	245
1093	...	...	...	...	...	...	...	...	...	...	...	+ ·7
1360	·0	− ·3	− ·3	− ·1	·0	+ ·3	− ·5	+ ·2	(+ ·4)	+ ·7	+ ·4	+ ·7
1627	+ ·3	− ·3	− ·4	− ·5	+ ·1	+ ·1	− ·2	(+ ·2)	+ ·7	+ ·7	(+ ·2)	− ·2
1894	− ·3	− ·3	− ·1	− ·4	·0	− ·4	− ·3	(− ·1)	(+ ·1)	(+ ·4)	+ ·7	+ ·6
2161	− ·3	+ ·2	− ·1	+ ·1	+ ·4	(·0)	(+ ·3)	+ ·6	+ ·5	+ ·6	·0	·0
2428	− ·4	− ·3	− ·3	− ·7	+ ·6	+ ·3	+ ·6	+ ·9	+1·1	+ ·9	+ ·5	− ·4
2695	− ·4	− ·1	− ·1	·0	·0	+ ·1	+1·1	+ ·4	+ ·9	+ ·5	− ·3	− ·5
2962	− ·1	− ·3	·0	+ ·1	(·0)	− ·1	− ·3	+ ·6	+ ·9	+ ·5	+ ·6	+ ·1
3229	− ·1	+ ·1	+ ·1	+ ·2	+ ·5	+ ·4	+ ·4	(+ ·2)	+ ·1	− ·4	− ·2	+ ·1
3496	− ·1	− ·3	− ·2	+ ·4	·0	+ ·3	− ·4	− ·7	+ ·3	+ ·2	(+ ·1)	·0
3763	− ·1	·0	+ ·3	+ ·4	+ ·3	+ ·5	+ ·5	(+ ·4)	+ ·4	+ ·1	+ ·3	·0
4030	+ ·1	− ·1	− ·2	·0	·0	·0	+ ·5	+ ·2	(+ ·3)	+ ·4	+ ·1	+ ·3
4297	+ ·2	·0	+ ·2	+ ·2	+ ·1	·0	− ·5	− ·8	− ·1	·0	− ·1	·0
4564	·0	+ ·1	+ ·3	+ ·4	+ ·3	(− ·1)	− ·5	− ·1	− ·1	− ·3	− ·4	− ·2
4831	− ·3	+ ·1	+ ·3	+ ·5	− ·2	− ·2	− ·2	·0	·0	− ·5	− ·5	− ·6
5098	− ·5	− ·3	− ·2	·0	(+ ·1)	+ ·2	+ ·5	·0	− ·1	·0	·0	·0
5365	− ·5	− ·2	...	...	...	...	...	...	...	...	...	...
Mean ...	−0·16	−0·13	−0·05	+0·04	+0·15	+0·09	+0·07	+0·13	+0·36	+0·25	+0·09	+0·04
Mag. from Curve	8·97	8·95	9·31	10·05	11·05	12·03	12·63	12·65	11·92	10·75	9·88	9·28

146. The period of this star has already been discussed in a provisional manner in Table XXII., where a correction of −3·9 days (see § 130) was deduced to the assumed period of 270 days. But although it was seen by a glance at these residuals that the period was in error, and a new period assumed, the method of getting an accurate correction to the period had not then been worked out, and by a rough graphical method the correction was estimated at −3 ; so that 267 days was assumed for Table XXXVIII. From this table taking the groups 1360+(4) and 4030+(4) we find a weighted mean correction of −1·1, giving a corrected period of 265·9 days, which sensibly agrees with the result found from Table XXII.

147. But a single determination of period for this star is not satisfactory, since CHANDLER gives the formula

$$2401636 + 268{\cdot}2E + 0{\cdot}246\,E^2 - 0{\cdot}005\,E^3.$$

As a rough comparison we may note that for E=37 we get a maximum at 2411643, and for E=49 a maximum at 2414780, giving an interval of 3137 days for 12 periods, or a mean period of 261·4 days, which is sensibly smaller than that found above. We

could get an agreement by correcting the coefficient of E^3 from $-\cdot005$ to $-\cdot0042$. But we proceed to determine several periods in the manner which has perhaps been sufficiently illustrated already, and need not be given in detail. Taking five groups of three periods beginning with 1360+(2), the weighted mean corrections found are $-1\cdot2$, $-1\cdot3$, $-0\cdot3$, $-1\cdot4$. These compare with the formula given by CHANDLER as follows, omitting 2410000 from the Julian date of maximum.

	E=37		40		43		46		49
Max.	1643·4		2438·0		3225·6		4007·2		4779·8
Interval		794·6		787·6		782·6		771·6	
Mean Period		264·9		262·5		260·9		257·2	
Rousdon		265·8		265·7		266·7		265·6	

148. From these figures it would appear that the formula represents the observations up to about E=36, and begins to run off after that. Indeed the formula is obviously only intended to represent the observations for a limited period. We cannot, however, discuss the revision at present.

It may be remarked that for E=43 the Rousdon maximum falls at 2413245, 19·4 days later than that given by the formula.

TABLE XXXIX.

R Camelopardi. Assumed period, 273 days.

Residuals for each Group of 22¾ Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	23	46	68	91	114	137	159	182	205	227	250
0856	...	...	...	...	...	...	...	...	+ ·1	...	·0	+1·5
1129	(+ ·3)	− ·8	− ·3	− ·5	− ·4	− ·1	(·0)	+ ·1	+1·0	(+ ·8)	(+ ·6)	(+ ·5)
1402	+ ·3	− ·6	·0	+ ·3	− ·2	− ·4	·0	+ ·2	+ ·7	(+ ·7)	+ ·7	+1·1
1675	+1·1	+ ·9	+ ·6	+ ·2	− ·2	·0	− ·2	− ·3	(− ·4)	− ·5	(− ·2)	+ ·2
1948	+1·1	+ ·4	+ ·4	+ ·3	+ ·2	+ ·6	·0	(− ·1)	− ·3	− ·8	− ·4	+ ·1
2221	+1·0	− ·5	− ·6	− ·2	·0	+ ·4	+ ·2	− ·4	− ·4	+ ·4	+ ·2	+ ·2
2494	− ·4	− ·6	− ·2	·0	+ ·3	+ ·6	− ·2	+1·0	+ ·4	+ ·3	+ ·3	− ·3
2767	− ·4	− ·6	− ·6	(− ·2)	+ ·1	+ ·4	+ ·1	(+ ·1)	+ ·1	·0	(− ·1)	− ·2
3040	(− ·8)	−1·3	− ·5	− ·1	+ ·2	+ ·4	+ ·3	− ·2	− ·2	+ ·1	+ ·3	·0
3313	− ·9	− ·6	− ·1	·0	+ ·2	+ ·2	− ·2	− ·1	+ ·1	(+ ·3)	(+ ·6)	+ ·8
3586	− ·1	− ·3	+ ·4	+ ·5	+ ·4	− ·1	− ·4	(− ·4)	− ·5	+ ·3	− ·2	(+ ·2)
3859	+ ·5	− ·4	·0	+ ·4	+ ·2	+ ·2	− ·6	(− ·3)	·0	+ ·4	·0	(+ ·6)
4132	+1·2	·0	·0	+ ·2	− ·3	− ·5	− ·5	− ·1	·0	− ·5	+ ·2	+ ·4
4405	+ ·8	− ·2	+ ·1	+ ·2	+ ·4	+ ·2	− ·5	− ·5	− ·3	− ·2	− ·3	(+ ·2)
4678	+ ·7	− ·1	·0	+ ·3	+ ·3	− ·2	− ·2	− ·6	− ·5	+ ·2	− ·5	+ ·4
4951	+ ·7	− ·4	− ·4	·0	− ·8	− ·6	−1·0	− ·7	− ·3	(+ ·1)	(+ ·6)	+1·0
5224	(+ ·8)	+ ·5	+ ·6	+ ·4	− ·4	− ·9	− ·1	− ·4	...	...	...	...
Mean ...	+0·37	−0·29	−0·04	+0·11	0·00	+0·01	−0·21	−0·17	−0·03	−0·11	+0·11	+0·42
Mag. from Curve	11·63	10·45	9·39	8·70	8·25	8·44	9·23	10·26	11·21	12·25	13·03	12·70

149. Forming the correction to period for two epochs from three groups of five consecutive periods, we get −1·5 and +2·1; giving periods of 271·5 and 275·1 days, against CHANDLER'S 269·5. Comparing CHANDLER'S maximum 2403939 with Rousdon 2413040+95=2413135, we get an interval of 9196 days for 34 periods, or a mean of 270·5. Is the period slowly lengthening ?

TABLE XL.

S Coronæ. Assumed period, 360 days.

Residuals for each Group of 30 *Days.*

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	30	60	90	120	150	180	210	240	270	300	330
0352	− ·4	− ·4	− ·5	+ ·5	+ ·4	+ ·8	·0	+ ·1	− ·2	...	...	...
0712	− ·6	−1·2	− ·7	− ·6	− ·3	− ·4	− ·4	+ ·2	(+ ·3)	+ ·3	...	...
1072	·0	−1·2	− ·9	+ ·3	+ ·8	+ ·9	+ ·6	+ ·5	(+ ·7)	+1·0	...	...
1432	+1·4	+ ·6	+ ·1	+ ·2	+ ·5	+ ·8	+ ·5	+ ·3	+ ·7	...	...	...
1792	...	− ·3	+ ·2	+ ·2	+ ·4	+ ·4	·0	+ ·3	+ ·3	...	...	...
2152	...	− ·6	− ·2	·0	+ ·2	+ ·9	·0	+ ·2	·0	− ·2	...	...
2512	+ ·3	+ ·1	− ·2	− ·3	− ·4	− ·2	− ·1	+ ·4	+ ·4	+ ·8	...	...
2872	...	+ ·4	+ ·3	− ·5	− ·4	− ·1	− ·2	+ ·2	− ·1	+ ·3	...	...
3232	...	+1·2	+ ·8	+ ·9	+ ·3	− ·1	+ ·7	+ ·4	+ ·9	+ ·2	...	...
3592	...	+ ·8	+ ·1	+ ·5	− ·1	− ·3	− ·2	− ·3	− ·3	− ·4	...	...
3952	...	+ ·7	·0	− ·3	− ·5	− ·7	−1·4	− ·9	− ·6	− ·3	+ ·4	...
4312	...	...	− ·6	− ·6	− ·3	− ·6	− ·6	− ·8	− ·5	·0	− ·3	...
4672	...	...	+ ·3	·0	− ·1	− ·2	− ·1	+ ·1	·0	− ·2	·0	...
5032	...	...	− ·3	− ·4	−1·0	− ·6	− ·8	− ·7	− ·5	− ·4	+ ·1	...
Mean ...	+0·14	+0·01	−0·11	−0·01	−0·04	+0·04	−0·14	0·00	+0·08	+0·10	+0·05	...
Mag. from Curve	8·03	7·43	7·44	7·88	8·61	9·34	10·10	10·83	11·58	12·27	12·12	10·08
0352+(4) ...	...	...	...	+ ·6	+1·8	+2·5	+ ·7	+1·4	+1·8	...	...	...
3592+(4) ...	...	...	...	− ·8	−2·0	−2·4	−3·1	−2·6	−1·9	...	...	...
Difference ...	...	...	...	−1·4	−3·8	−4·9	−3·8	−4·0	−3·7	...	...	...
Factor 1·3 ...	...	...	...	−1·8	−4·9	−6·4	−4·9	−5·2	−4·8	...	...	...
p−*f*... ...	...	...	...	−1·2	−1·5	−1·5	−1·5	−1·5	−1·4	...	...	...
Corr. Period	...	...	...	+1·5	+3·3	+4·3	+3·3	+3·5	+3·4	...	...	...

150. The available columns show a very consistent correction to period of +3·3 days (weighted mean), giving 363·3 days for the period. CHANDLER gives 360·8. His epoch of maximum is 2400647, and comparing this with Rousdon 2412872+45=2412917, we get an interval of 12270 days for 34 periods; or 360·9 days for one, which agrees well with CHANDLER'S value. Unless, therefore, CHANDLER'S initial maximum is about 70 or 80 days too late, which does not seem likely, the Rousdon observations indicate that the period is slowly lengthening at present.

TABLE XLI.

R Ursæ Minoris. Assumed period, 324 days.

Residuals for each Group of 27 Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	27	54	81	108	135	162	189	216	243	270	297
2013	(·0)	− ·2	+ ·1	+ ·4	+ ·3	+ ·8	+ ·2	+ ·2	− ·2	− ·2	·0	− ·2
2337	+ ·2	·0	·0	− ·1	·0	·0	− ·2	·0	− ·3	·0	− ·3	− ·4
2661	+ ·1	·0	+ ·3	·0	·0	+ ·1	+ ·2	·0	·0	− ·1	− ·2	− ·1
2985	+ ·2	+ ·3	− ·1	− ·2	·0	− ·1	− ·3	+ ·1	+ ·1	− ·1	(− ·4)	− ·4
3309	− ·1	− ·1	− ·1	− ·4	− ·1	·0	− ·2	·0	+ ·2	·0	·0	− ·2
3633	+ ·2	+ ·1	− ·1	(− ·2)	− ·2	− ·1	+ ·1	+ ·4	·0	+ ·1	− ·4	− ·5
3957	(− ·3)	− ·1	·0	− ·1	+ ·1	·0	− ·2	+ ·3	− ·1	(·0)	·0	+ ·5
4281	+ ·2	(+ ·2)	+ ·2	+ ·1	− ·1	+ ·5	− ·1	− ·1	(+ ·1)	+ ·3	+ ·2	(+ ·2)
4605	+ ·2	− ·1	− ·1	− ·1	+ ·2	+ ·2	− ·2	(− ·3)	− ·3	(− ·2)	− ·1	+ ·3
4929	+ ·7	·0	+ ·2	− ·4	+ ·4	+ ·5	·0	− ·3	(− ·3)	− ·3	− ·4	+ ·2
5253	+ ·2	·0	− ·3	− ·3	+ ·1	...	...	...	...	...	...	...
Mean	+0·14	+0·01	+0·01	−0·12	+0·06	+0·19	−0·07	+0·00	−0·08	−0·05	−0·16	−0·06
Mag. from Curve	9·63	9·55	9·46	9·36	9·29	9·24	9·20	9·20	9·28	9·39	9·52	9·61
2013+(4) ...	+ ·4	·0	+ ·2	− ·3	+ ·2	+ ·8	− ·3	+ ·3	− ·2	− ·4	− ·9	−1·3
3633+(4) ...	+1·0	+ ·1	+ ·2	− ·7	+ ·4	+1·1	− ·4	·0	− ·6	− ·1	− ·7	+ ·7
Difference ...	+ ·6	+ ·1	·0	− ·4	+ ·2	+ ·3	− ·1	− ·3	− ·4	+ ·3	+ ·2	+2·0
Factor 2·1 ...	+1·3	+ ·2	·0	− ·8	+ ·4	+ ·6	− ·2	− ·6	− ·8	+ ·6	+ ·4	+4·2
p−*f*	·0	+ ·3	+ ·3	+ ·1	− ·2	+ ·2	+ ·2	− ·1	− ·1	− ·2	− ·2	− ·4

151. In forming $p-f$ the means of the residuals have been added to the magnitude from curve. But the changes of magnitude are so small that no trustworthy correction to period can be deduced. The weighted mean is $-4{\cdot}2$ days, giving a period of 319·8 days.

TABLE XLII.

R Draconis. Assumed period, 246 days.

Residuals for each Group of 21 Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	21	41	62	82	103	123	144	164	185	205	226
962	...	...	...	...	...	...	...	+1·2	+1·1	+ ·4	− ·2	·0
1208	+ ·1	+ ·1	− ·1	+ ·2	+ ·3	·0	− ·2	− ·6	− ·7	− ·1	− ·6	− ·3
1454	− ·2	(− ·1)	·0	+ ·5	+ ·6	+ ·9	+ ·6	+ ·6	+ ·2	+ ·5	+ ·4	+ ·2
1700	+ ·1	− ·3	·0	(− ·1)	− ·2	(− ·5)	− ·7	− ·3	+ ·1	− ·1	+ ·1	·0
1946	+ ·2	+ ·4	+ ·2	+ ·2	+ ·4	(+ ·2)	·0	+ ·3	(− ·2)	− ·8	− ·6	− ·1
2192	+ ·3	+ ·5	+ ·1	(+ ·6)	+1·0	+1·2	(+1·0)	+ ·8	+ ·6	− ·1	+ ·1	·0

TABLE XLII—*continued.*

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	21	41	62	82	103	123	144	164	185	205	226
2438	− ·1	− ·4	+ ·3	+1·9	+ ·2	− ·5	·0	− ·2	− ·1	·0	− ·4	− ·5
2684	− ·7	·0	(+ ·2)	+ ·5	+ ·2	− ·4	− ·4	(− ·3)	− ·2	·0	− ·2	+ ·3
2930	·0	− ·1	+ ·2	+ ·1	− ·2	+ ·4	+ ·4	− ·2	+ ·2	− ·2	− ·2	− ·4
3176	− ·6	(− ·5)	− ·5	− ·2	(+ ·1)	+ ·4	+ ·3	+ ·3	+ ·1	+ ·1	·0	+ ·1
3422	− ·1	− ·2	− ·2	− ·4	− ·9	−1·1	− ·8	− ·6	+ ·1	+ ·1	(− ·2)	− ·3
3668	− ·4	− ·4	− ·7	− ·6	− ·6	− ·5	− ·7	− ·7	+ ·1	− ·1	+ ·3	+ ·2
3914	+ ·3	·0	− ·3	(− ·2)	(− ·2)	− ·2	+ ·1	+ ·4	+ ·2	+ ·3	·0	(·0)
4160	+ ·1	+ ·2	+ ·4	+ ·5	+ ·1	− ·2	+ ·3	(·0)	− ·3	·0	− ·1	− ·2
4406	− ·1	(− ·3)	− ·5	− ·8	− ·5	−1·0	− ·4	−1·0	− ·7	·0	− ·1	+ ·2
4652	+ ·4	− ·3	− ·2	− ·4	− ·4	+ ·9	+1·0	·0	+ ·2	+ ·4	+ ·8	+ ·6
4898	+ ·6	+ ·7	− ·3	+ ·6	+ ·6	+ ·9	+ ·8	+ ·8	− ·2	− ·1	+ ·5	+ ·4
5144	+ ·3	− ·1	− ·8	− ·3	(·0)	+ ·3	+ ·1	− ·8	− ·3	− ·5	− ·4	− ·4
Mean	+0·01	−0·05	−0·13	+0·12	+0·03	+0·05	+0·08	−0·02	+0·01	−0·01	−0·04	−0·01
Mag. from Curve	10·32	11·46	12·12	12·34	12·00	10·95	9·70	8·35	7·70	7·66	8·19	9·25
p−*f*	−2·2	−1·7	−1·1	0·0	+1·5	+2·3	+2·7	+2·1	+0·7	−0·4	−1·6	−2·2

152. The weighted mean corrections to adopted period at two epochs found from three consecutive groups of 5 periods are −0·3 and +0·1 days respectively, or −0·2 in the mean; giving 245·8 as the period from Rousdon observations alone. CHANDLER'S period is 245·6, and combining his maximum 2406716 with Rousdon 2413176+178 =2413354 we get an interval of 6638 days for 27 periods, giving a mean of 245·8, which agrees exactly with the Rousdon determination.

TABLE XLIII. S Herculis. Assumed period, 308 days.

Residuals for each Group of 25½ Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	26	51	77	103	128	154	179	205	231	256	282
0145	...	...	...	...	...	...	...	...	...	+ ·9	+ ·6	+ ·3
0453	+ ·3	(+ ·6)	+ ·9	+ ·1	− ·6	+ ·3	− ·2	+ ·1	...	...	...	+ ·8
0761	+ ·5	(+ ·2)	·0	− ·3	− ·4	+ ·2	− ·8	+ ·2	+ ·5	...	...	...
1069	...	...	+ ·1	− ·8	− ·8	− ·2	−1·1	−1·3	− ·1	+ ·4	+ ·4	...
1377	...	...	...	...	...	+ ·8	+ ·1	− ·4	·0	+ ·7	+ ·9	...
1685	...	...	...	...	...	...	...	− ·6	− ·5	− ·2	+ ·4	+ ·1
1993	− ·1	(+ ·2)	(+ ·6)	+ ·9	...	...	...	...	+ ·3	+ ·1	+ ·6	+ ·3
2301	+ ·5	+1·3	+ ·7	+ ·5	+ ·5	+ ·4	+ ·1	...	...	...	+ ·2	+ ·4
2609	+ ·7	+1·4	+1·3	+ ·2	− ·2	+ ·2	− ·4	− ·2	+ ·2	...	...	...
2917	...	...	+1·0	·0	·0	+ ·4	+ ·2	− ·2	− ·5	...	...	...
3225	...	...	...	+ ·7	+ ·2	+ ·9	+ ·7	− ·2	− ·3	− ·1	− ·3	+ ·1
3533	...	...	...	...	...	+ ·7	+ ·3	− ·1	·0	− ·4	− ·5	− ·5

TABLE XLIII—*continued.*

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	26	51	77	103	128	154	179	205	231	256	282
3841	− ·2	...	...	...	...	...	...	...	+ ·2	− ·3	− ·6	−1·0
4149	− ·1	+ ·9	+1·3	+ ·8	− ·6	...	...	...	...	− ·1	− ·6	...
4457	−1·0	− ·3	− ·6	− ·9	−1·0	− ·2	− ·3	− ·6	...	...	...	...
4765	− ·6	− ·6	− ·6	− ·4	− ·3	·0	−1·1	− ·5	·0	+ ·7	...	...
5073	...	...	+ ·2	(·0)	− ·1	− ·2	− ·7	− ·8	− ·4	+ ·1	+ ·3	...
Mean ...	0·00	+0·46	+0·45	+0·07	−0·30	+0·28	−0·27	−0·38	−0·05	+0·16	+0·13	+0·06
Mag. from Curve	12·00	11·79	10·95	10·25	9·67	8·63	7·92	7·63	8·07	9·08	10·11	11·35
Adopted 1069	+ ·5	+ ·2	+ ·4	− ·3	− ·6	+ ·4	− ·5	− ·4	·0	+ ·4	+ ·4	+ ·6
„ 2609	+ ·6	+1·2	+1·1	+ ·4	+ ·1	+ ·3	·0	− ·2	− ·1	·0	·0	+ ·2
„ 4149	− ·4	·0	+ ·2	·0	− ·6	+ ·2	·0	− ·4	·0	− ·1	− ·6	− ·6

153. The series are so broken that the expedient has been resorted to of adopting by inspection a mean residual for three periods, as given at the foot of the table. By taking these in two pairs, the weighted mean corrections to period are found to be +2·3 and −0·4 days, giving periods of 310·3 and 307·6 ; or a mean period of 309·0 days. CHANDLER gives 308·1, with the remark "large irregularities." It seems therefore scarcely worth while to discuss the period further from the Rousdon observations alone. But it may be added that CHANDLER'S epoch 2399202 combined with Rousdon 2412609+170 = 2412779 gives an interval of 13577 days for 44 periods, or 308·6 as a mean.

TABLE XLIV. T Draconis. Assumed period, 426 days.
Residuals for each Group of 35½ Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	36	71	107	142	178	213	249	284	320	355	391
3294	− ·1	− ·1	− ·1	− ·4	− ·4	− ·2	+ ·1	− ·1	− ·4	+ ·1	·0	− ·1
3720	− ·3	− ·2	− ·1	− ·5	− ·7	− ·7	− ·5	− ·4	− ·3	− ·2	+ ·2	− ·3
4146	− ·3	− ·1	·0	− ·1	− ·3	− ·5	+ ·6	− ·5	·0	·0	+ ·1	− ·1
4572	− ·1	− ·1	+ ·2	+ ·2	+ 1·0	+ ·2	+ ·2	+ ·5	+ ·2	+ ·2	+ ·4	+ ·3
4998	+ ·5	+ ·8	+ 1·9	+ ·4	+ ·4	·0	+ ·4	+ ·6	·0	− ·1	− ·2	(− ·2)
Mean ...	− 0·06	+ 0·06	+ 0·38	− 0·08	0·00	− 0·24	+ 0·16	+ 0·02	− 0·10	0·00	+0·10	−0·08
Mag. from Curve	9·20	9·60	10·02	10·40	10·55	10·16	9·57	8·95	8·31	8·23	8·47	8·82
3294+(1) ...	− ·4	− ·3	− ·2	− ·9	− 1·1	− ·9	− ·4	− ·5	− ·7	− ·1	+ ·2	− ·4
4572+(1) ...	+ ·4	+ ·7	+ 2·1	+ 0·6	+ 1·4	+ ·2	+ ·6	+ 1·1	+ ·2	+ ·1	+ ·2	+ ·1
Difference ...	+ ·8	+ 1·0	+ 2·3	+ 1·5	+ 2·5	+ 1·1	+ 1·0	+ 1·6	+ ·9	+ ·2	·0	+ ·5
Factor 11·3 ...	+ 9·0	+11·3	+26·0	+16·9	+28·3	+12·4	+11·3	+18·1	+10·2	+2·3	0·0	+5·6
p−*f*	− 0·9	− 1·3	− 0·7	− 0·2	+ 0·4	+ 0·8	+ 0·9	+ 1·5	+ 0·7	−0·4	−0·5	−0·6
Corr. Period	−10·0	− 8·7	−37·1	...	...	+15·5	+12·6	+12·1	+14·6	−5·8	...	−9·3

154. The material is scarcely sufficient for discussing any change of period, especially as the later observations seem to be systematically fainter than the earlier ones. This change may be either in the star or the observer. It should be eliminated from the weighted mean, although the individual determinations are discordant. The weighted mean is +2·3, giving a period of 428·3 days. CHANDLER quotes 569 from HARTWIG (from two maxima only), which corresponds to about 16 of the above groups, but does not seem to be supported by the evidence. The maximum quoted is 2413190, which belongs to the period immediately preceding the Rousdon observations, and agrees with them satisfactorily.

TABLE XLV.

R Cygni. Assumed period, 432 days.

Residuals for each Group of 36 Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	36	72	108	144	180	216	252	288	324	360	396
0155	...	...	...	...	...	...	...	+1·2	+ ·4	·0	+ ·1	− ·3
0587	·0	− ·5	...	...	+1·3	+ ·3	− ·4	− ·8	− ·1	− ·2	+ ·6	− ·3
1019	− ·4	− ·4	−·9	...	...	+ 1·7	+ ·8	− ·1	− ·1	− ·5	− ·5	− 1·1
1451	− ·3	− ·4	+·4	...	+1·2	+ ·3	− ·5	− ·3	·0	− ·2	− ·4	− ·5
1883	− ·5	− ·6	+·3	...	+1·0	+ ·3	− ·1	− ·2	− ·1	− ·5	− ·7	− ·4
2315	·0	+ ·2	+·2	...	...	+ 1·5	− ·1	+ ·2	+ ·3	− ·3	− ·4	− ·5
2747	·0	·0	...	...	...	+ ·9	− ·1	+ 1	+ ·1	− ·2	− ·2	·0
3179	·0	+ ·5	...	...	− ·9	− 1·5	−1·3	− ·3	+ ·4	+ ·3	+ ·5	+ ·7
3611	(·0)	...	...	...	− ·3	+ ·1	− ·3	+ ·3	+ ·6	+ ·1	+ ·3	+ 1·1
4043	+1·3	...	...	...	...	− ·2	− ·8	+ ·1	+ ·5	+ ·2	+ ·8	+ ·5
4475	+ ·7	...	...	+ ·2	+ ·2	− ·5	...	...	...	...	...	...
Mean ...	+0·08	−0·17	0·00	+0·20	−0·42	+ 0·29	−0·31	+0·02	+0·20	−0·13	+0·01	− 0·08
Mag. from Curve	11·10	12·07	12·78	12·70	11·53	10·18	8·80	7·86	8·07	8·80	9·57	10·33
0587+(3) ...	−1·2	...	...	...	...	+ 2·6	− ·2	−1·4	− ·3	−1·4	−1·0	− 2·3
2747+(3) ...	+1·3	...	...	...	...	− ·7	−2·5	+ ·2	+1·6	+ ·4	+1·4	+ 2·3
Difference ...	+2·5	...	...	...	...	− 3·3	−2·3	+1·6	+1·9	+1·8	+2·4	+ 4·6
Factor 3·44 ...	+8·6	...	...	...	...	−11·3	−7·9	+5·5	+6·5	+6·2	+8·3	+15·8
$p-f$	−1·6	...	...	...	...	+ 2·6	+2·6	+0·2	−1·0	−1·3	−1·6	− 1·6
Corr. Period	−5·4	...	...	...	...	− 4·4	−3·0	...	−6·5	−4·8	−5·2	− 9·9

155. The weighted mean correction to period is −5·0 days, giving 427·0 as the correct period. CHANDLER gives 425·7; but his epoch 2398509 compared with Rousdon 2412580 gives 14071 days for 33 periods, or a mean period of 426·4 days. Is the period slowly lengthening?

TABLE XLVI.

χ Cygni. Assumed period, 408 days.

Residuals for each Group of 34 Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	34	68	102	136	170	204	238	272	306	340	374
(9999)	...	...	...	...	...	...	...	...	...	+ ·6	(+ ·5)	+ ·5
0407	+ ·1	+ ·6	+ ·6	+ ·4	(+ ·1)	(− ·2)	− ·6	+ ·1	− ·1	(− ·2)	− ·4	− 1·4
0815	− ·4	− ·5	− ·1	− ·3	− ·2	+ ·9	+ 1·1	(+ ·4)	(− ·3)	− ·9	− ·4	+ ·3
1223	+ ·6	+ 1·1	+ ·2	+ 1·4	...	...	...	(·0)	− ·7	− 1·4	− ·8	− ·5
1631	− ·1	− ·9	− ·5	− ·2	...	...	...	+ 1·0	+ 1·0	− ·2	− ·2	+ ·2
2039	+ ·2	− ·5	(− ·2)	·0	...	...	...	− ·4	+ ·6	− ·5	+ ·4	+ ·8
2447	+ ·2	− ·3	− ·2	(− 1·0)	− 1·7	+ ·4	+ ·3	+ ·1	+ ·5	+ ·1	·0	+ ·1
2855	− ·5	(− ·3)	(− ·1)	+ ·1	+ ·1	+ ·4	− ·4	+ ·3	+ ·9	+ ·3	+ ·2	− ·8
3263	(− ·6)	(− ·4)	− ·2	+ ·1	(+ ·2)	+ ·4	+ ·8	+ ·9	+ 1·0	+ ·7	+ 1·4	(+ 1·0)
3671	+ ·9	+ ·7	+ ·5	+ ·5	− ·5	+ ·4	− ·1	− ·5	+ ·3	− ·5	(− ·2)	+ ·1
4079	− ·4	− ·6	− ·6	·0	+ ·5	+ ·4	+ ·2	− ·9	...	...	...	...
Mean ...	+ 0·00	− 0·11	− 0·06	+ 0·10	− 0·21	+ 0·49	+ 0·19	+ 0·10	+ 0·36	− 0·20	+ 0·05	+ 0·03
Mag. from Curve	8·15	9 65	11·16	12·55	13·46	13·24	11·63	9·91	8·12	6·36	5·90	6·66
0407+(3) ...	+ ·2	+ ·3	+ ·2	+ 1·3	...	...	...	+ 1·5	− ·1	− 2·7	− 1·8	− 1·4
2447+(3) ...	·0	− ·3	·0	− ·3	...	...	...	+ ·8	+ 2·7	+ ·6	+ 1·4	+ ·4
Difference ...	− ·2	− ·6	− ·2	− 1·6	...	...	...	− ·7	+ 2·8	+ 3·3	+ 3·2	+ 1·8
Factor 3·24 ...	− ·6	− 1·9	− ·6	− 5·2	...	...	...	− 2·3	+ 9·1	+ 10·7	+ 10·4	+ 5·8
p−*f*	− 3·1	− 2·9	− 3·0	− 2·2	...	...	...	+ 3·3	+ 3·8	+ 2·5	− 0·5	− 2·2
Corr. Period	+ 0·2	+ 0·7	+ 0·2	+ 2·4	...	...	...	− 0·7	+ 2·4	+ 4·3	...	− 2·6

156. The weighted mean correction to period is −1·0 days, giving 407·0 as the true period. CHANDLER's formula is $2365136{\cdot}5+406{\cdot}02E+0{\cdot}0075E^2+25\sin(5^\circ E+272^\circ)$, and by this formula a maximum should fall at 2412354·6 when E = 116. The Rousdon maximum falls at 2412039+336 = 2412375, which is 20 days later: not perhaps a large error in 116 periods of 408 days. For the interval to the next maximum the formula gives 406·2 days, whereas we have deduced 407·0 above. If we throw the difference on the term in E^2, we must make the coefficient ·0112 instead of ·0075, which advances the time of the maximum for E=116 by 50 days, which is too much. If we alter the coefficient of E in the periodic term to 4°·76, the period at E=116 will then agree with the Rousdon observations, and the formula-maximum is advanced 5·7 days nearer the Rousdon maximum, i.e. within 15 days of it.

TABLE XLVII.

S Cygni. Assumed period, 324 days.

Residuals for each Group of 27 Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Period.	0	27	54	81	108	135	162	189	216	243	270	297
2124 ...	+ ·4	+1·1	+ ·3	...	...	...	...	...	...	− ·5	+ ·3	− ·3
2448 ...	− ·3	·0	+ ·8	...	...	...	...	...	...	...	+ ·6	+ ·6
2772 ...	− ·1	+ ·5	+ ·8	...	...	...	...	...	...	+ ·7	(+ ·4)	·0
3096 ...	− ·3	+ ·3	+ ·5	...	...	...	...	...	...	+ ·1	− ·9	−1·1
3420 ...	− ·3	·0	− ·2	...	...	...	...	...	...	− ·3	− ·8	− ·9
3744 ...	·0	+ ·5	+ ·8	...	...	...	...	...	...	...	− ·8	−1·2
4068 ...	− ·5	− ·1	− ·4	...	...	...	...	...	...	...	+1·3	+ ·8
4392 ...	+ ·1	− ·6	− ·7	...	...	...	...	...	...	...	+1·3	+1·2
4716 ...	+ ·1	+ ·1	− ·5	...	...	...	...	...	...	+ ·7	− ·3	− ·5
5040 ...	− ·5	− ·3	− ·7	...	...	...	...	...	...	...	+ ·8	+1·4
5364 ...	+1·1	...	...	...	...	...	...	...	...	...	...	...
Mean ...	−0·03	+0·15	+0·07	...	...	...	...	...	...	+0·14	+0·19	·00
Mag. from Curve	10·19	10·80	12·07	...	...	...	...	...	...	12·80	12·38	10·96
2124+(4) ...	− ·6	+1·9	+2·2	...	...	...	...	...	...	...	− ·4	−1·7
3744+(4) ...	− ·8	− ·4	−1·5	...	...	...	...	...	...	...	+2·3	+1·7
Difference ...	− ·2	−2·3	−3·7	...	...	...	...	...	...	...	+2·7	+3·4
Factor 2·06	−0·4	−4·7	−7·6	...	...	...	...	...	...	...	+5·6	+7·0
p−*f* ...	0·0	−2·0	−2·2	...	...	...	...	...	...	...	+2·0	+2·3
Corr. Period	...	+2·4	+3·5	...	...	...	...	...	...	...	+2·8	+3·0

157. The weighted mean correction to period is +3·0 days, giving as the corrected period 327·0 days. CHANDLER'S formula is

$$2402417 + 322{\cdot}8E + 15 \sin (12°E + 66°)$$

and for the mean epoch of the Rousdon observations E = 35, which gives a maximum at 2413727 as compared with Rousdon 2413744. The period at that time according to the formula is $322{\cdot}8 + 15(\sin 126° - \sin 114°) = 321{\cdot}3$, which differs sensibly from the 327·0 found above. The periods at epoch would agree better if the coefficient of E in the periodic term were smaller, say 9° instead of 12°, which would make the period

$$322{\cdot}8 + 15(\sin 21° - \sin 9°) = 325{\cdot}8 \text{ days}$$

and the maximum would not be much affected, falling only six days earlier.

TABLE XLVIII.

T Cephei. Assumed period, 384 days.

Residuals for each Group of 32 Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	32	64	96	128	160	192	224	256	288	320	352
1871 ...	...	...	...	...	...	...	+ 1·1	+ ·1	·0	− ·3	− ·5	− ·1
2255 ...	− ·3	− ·2	− ·5	+ ·2	+ ·2	+ ·3	+ ·5	+ ·2	+ ·6	− ·1	·0	+ ·2
2639 ...	− ·3	− ·6	− ·5	+ ·3	+ ·3	·0	(− ·1)	− ·2	− ·5	− ·6	·0	− ·4
3023 ...	+ ·4	− ·3	+ ·1	− ·1	+ ·5	·0	− ·2	+ ·3	+ ·7	− ·2	− ·1	+ ·3
3407 ...	+ ·4	+ ·7	+ ·5	− ·1	+ ·5	+ ·1	− ·4	+ ·4	− ·1	− ·1	+ ·1	+ ·5
3791 ...	+ ·6	+ ·2	+ ·7	+ ·6	+ ·2	+ ·1	− ·2	(·0)	+ ·2	+ ·4	+ ·4	+ ·6
4175 ...	+ ·5	+ 1·0	+ ·1	+ ·1	(− ·2)	− ·5	− ·8	− 1·1	− ·3	− ·1	− ·1	− ·6
4559 ...	− ·5	− ·1	− ·3	− ·7	− ·8	− ·6	− 1·0	− ·7	− ·4	− ·1	+ ·2	− ·7
4943 ...	− ·2	+ ·6	·0	...	...	...	...	...	...	...	...	...
Mean ...	+0·08	+ 0·16	+0·01	+0·04	+0·10	−0·09	− 0·14	− 0·12	+0·03	−0·14	0·00	−0·03
Mag. from Curve	7·50	6·80	6·38	6·83	7·56	8·32	9·07	9·62	9·53	8·93	8·10	7·60
2255+(2) ...	− ·2	− 1·1	− ·9	+ ·4	+1·0	+ ·3	+ ·2	+ ·3	+ ·8	− ·9	− ·1	+ ·1
3791+(2) ...	+ ·6	+ 1·1	+ ·5	·0	− ·8	−1·0	− 2·0	− 1·8	− ·5	+ ·2	+ ·5	− ·7
Difference ...	+ ·8	+ 2·2	+1·4	− ·4	−1·8	−1·3	− 2·2	− 2·1	−1·3	+1·1	+ ·6	− ·8
Factor 5·09	+4·1	+11·2	+7·1	−2·0	−9·2	−6·6	−11·2	−10·7	−6·6	+6·0	+3·1	−4·1
p−*f* ...	+0·6	+ 1·2	+0·1	−1·3	−1·4	−1·3	− 1·2	− 0·6	+0·7	+1·5	+1·2	+0·6
Corr. Period	+6·8	+ 9·3	...	+1·5	+6·6	+5·1	+ 9·3	+17·8	−9·4	+4·0	+2·6	−6·8

158. The weighted mean correction to period is +4·9 days, so that the corrected period is 388·9. CHANDLER gives 387 with a maximum at 2405359. Combining this with the Rousdon maximum at 2413407+64 = 2413471 we get an interval of 8112 days for 21 periods, which gives a mean of 386·3 days. The evidence is thus in favour of a period which has passed through a minimum value somewhere about 7 or 8 periods from CHANDLER'S initial maximum—say about 2408000. But too much stress must not be laid on the meagre evidence available.

TABLE XLIX.

S Cephei. Assumed period, 480 days.

Residuals for each Group of 40 Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	40	80	120	160	200	240	280	320	360	400	440
0069	...	...	− ·5	...	− ·4	+ ·1	+ ·3	+ ·5	− ·1	− ·2	− ·2	·0
0549	+ ·2	·0	+ ·1	+ ·1	+ ·1	+ ·6	+ ·7	+ 1·0	+ ·8	+ ·2	+ ·6	+ ·5
1029	+ 1·1	+ ·3	− ·2	+ ·6	+ ·8	+ ·7	+ ·8	+ 1·3	+ ·7	+ ·2	·0	+ ·3
1509	− ·2	+ ·2	+ ·2	+ ·3	+ ·4	+ ·7	+ 1·3	+ 1·2	+ 1·3	+ 1·3	+ ·8	+ 1·2
1989	+ 1·8	+ 1·2	+ ·7	(+1·2)	+ 1·8	+ 1·5	+ 1·6	+ 2·0	+ 2·2	+ 1·2	+ 1·6	+ 1·1
2469	+ ·7	+ ·2	− ·1	·0	·0	− ·1	+ ·6	+ ·2	+ ·2	+ ·3	·0	− ·7
2949	− ·7	− ·5	− ·2	− ·3	− ·4	− ·7	− ·7	− ·5	·0	+ ·1	− ·5	− ·8
3429	− ·1	+ ·1	− ·1	− ·2	− ·2	− ·6	− 1·1	− 1·4	− 1·5	− 1·6	− 1·2	− 1·4
3909	− 1·5	− 1·3	−1·2	− ·6	− ·9	− 1·5	− 1·4	− 2·1	− 1·6	− 1·1	− ·6	− ·5
4389	− ·7	− ·5	·0	− ·2	− ·6	− ·9	− 1·0	− 1·1	− ·2	·0	+ 1·1	+ ·1
4869	+ ·1	+ ·6	+ ·9	+ ·4	− ·3	− ·7	− 1·2	− 1·6	− 1·7	− 1·0	− ·1	+ ·2
5349	− ·3	...	...	...	...	...	...	...	...	...	...	...
Mean ...	+ 0·04	+ 0·03	−0·04	+0·13	+ 0·03	− 0·08	− 0·01	− 0·05	+ 0·01	− 0·05	+ 0·14	0·00
Mag. from Curve	10·22	9·70	9·10	8·85	9·05	9·49	10·06	10·62	11·06	11·18	10·92	10·40
0549+(4) ...	+ 3·6	+ 1·9	+ ·7	+2·2	+ 3·1	+ 3·4	+ 5·0	+ 5·7	+ 5·2	+ 3·2	+ 3·0	+ 2·4
2949+(4) ...	− 2·9	− 1·6	− ·6	− ·9	− 2·4	− 4·4	− 5·4	− 6·7	− 5·0	− 3·6	− 1·3	− 2·4
Difference ...	− 6·5	− 3·5	−1·3	−3·1	− 5·5	− 7·8	−10·4	−12·4	−10·2	− 6·8	− 4·3	− 4·8
Factor 3·05 ...	−19·8	−10·6	−4·0	−9·5	−16·8	−23·8	−31·7	−37·8	−31·1	−20·7	−13·1	−14·6
$p-f$... ...	+ 0·7	+ 1·2	+0·8	·0	− 0·4	− 1·0	− 1·1	− 1·0	− 0·6	·0	+ 0·7	+ 0·8
Corr. Period	− 2·8	− ·9	− ·5	...	+ 4·2	+ 2·4	+ 2·9	+ 3·8	− 5·2	...	− 1·9	− 1·8

159. The discordant values for the correction to period from the different columns originate in some apparent change, either in the star or the observer, during the observations. *S Cephei* is peculiarly difficult to observe, being a very red star,* and different observers differ considerably—as much as two magnitudes (see *Harvard Annals*, vol. xxxvii. part 1, p. 84, &c., for special observations to illustrate this point)—and it is possible that the same observer sensibly varies his habit at different times. If, however, the change, whatever it is, is approximately constant, it should be eliminated in the weighted mean of the correction to period, which is found to be

* It may be remarked that a photograph taken of the region with 75^m exposure on a "Rocket" plate with the astrographic equatorial at the University Observatory, Oxford, on a very clear night (1903 November 25) showed no trace of *S Cephei*, which was then *near maximum*.

+9·8 days, giving a corrected period of 489·8 days. CHANDLER gives 484, with a maximum at 2402409. Combining this with the Rousdon 2412469+120=2412589, we get an interval of 10180 days for 21 periods, which gives a mean period of 484·7 days. Is the period slowly lengthening ?

TABLE L.

R Cassiopeiæ. Assumed period, 432 days.

Residuals for each Group of 36 Days.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	36	72	108	144	180	216	252	288	324	360	396
0050	...	...	...	...	...	...	...	...	...	...	− ·5	− ·6
0482	− ·6	− ·1	− ·6	− ·2	+ ·3	...	...	...	− ·1	+ ·2	+ ·3	+ ·5
0914	+ ·7	+ ·3	+ ·2	(+ ·1)	·0	+ ·6	·0	− 0·8	− 0·8	− ·6	− ·6	− ·3
1346	+ ·6	+ ·4	+ ·2	+ ·2	+ ·3	+ ·4	+ ·1	− ·3	− ·5	− ·6	− ·3	+ ·4
1778	+ ·1	+ ·3	+ ·1	+ ·5	+ ·5	+ ·2	− ·1	− ·7	− ·8	− ·5	− 1·1	− ·3
2210	+ ·4	− ·1	− ·1	·0	+ ·2	+ ·2	+ ·2	+ ·2	+ ·2	− ·3	− 1·3	− ·5
2642	+1·0	+ ·7	+ ·1	+ ·4	+ ·6	+ ·7	+ ·5	·0	− ·4	− ·4	− 1·1	+ ·1
3074	+ ·6	− ·1	− ·5	− ·2	− ·4	− ·1	+ ·3	+ ·4	− ·3	·0	− ·1	+ ·1
3506	+ ·6	− ·1	·0	− ·1	− ·2	− ·2	− ·5	− ·5	− ·5	− ·1	+ ·5	·0
3938	− ·4	− ·5	·0	− ·5	− ·4	− ·7	− ·5	− ·4	− ·7	− ·6	− ·3	− ·7
4370	−1·0	− ·6	− ·1	·0	·0	+ ·2	+ ·5	+ 1·6	+ 1·2	+ 1·0	+ 1·8	+ ·5
4802	− ·6	− ·8	− ·4	− ·3	+ ·1	+ ·4	+ ·3	+ 1·3	+ 3·3	+ 2·3	+ 2·8	+1·9
5234	+ ·7	+ 1·1	+ ·5	+ ·8	+1·4	...	...	...	...	...	...	...
Mean ...	+0·18	+ 0·04	−0·05	+0·06	+0·20	+0·17	+0·08	+0·08	+ 0·05	+ 0·04	+ 0·01	+0·09
Mag. from Curve	6·78	7·58	8·25	8·70	9·38	10·50	11·07	10·98	10·42	9·56	7·97	6·55
0914+(4) ...	+2·8	+ 1·6	+ ·5	+1·2	+1·6	+2·1	+ ·7	− 1·6	− 2·3	− 2·4	− 4·4	− ·6
3074+(4) ...	− ·8	− 2·1	−1·0	−1·1	− ·9	− ·4	+ ·1	+ 2·4	+ 3·0	+ 2·6	+ 4·7	+1·8
Difference ...	−3·6	− 3·7	−1·5	−2·3	−2·5	−2·5	− ·6	+ 4·0	+ 5·3	+ 5·0	+ 9·1	+2·4
Factor 2·75 ...	−9·9	−10·1	−4·1	−6·3	−6·9	−6·9	−1·7	+11·0	+14·6	+13·7	+25·0	+6·6
p−*f*... ...	−1·0	− 1·2	−1·1	−1·4	−1·9	−1·6	−0·3	+ 0·7	+ 1·4	+ 2·5	+ 3·0	+1·0
Corr. Period	+9·9	+ 8·4	+3·7	+4·5	+3·6	+4·3	+5·7	+15·7	+10·4	+ 5·5	+ 8·3	+6·6

A correction of +0·2 has been applied to the residuals from "numbered" comparison stars, as indicated in § 99.

160. The weighted mean correction to period is +6·7 days, giving a corrected period of 438·7 days. CHANDLER's formula is

$$2398404+429{\cdot}5\,E+25\sin(15^\circ E+0^\circ)$$

and when E = 33 this gives a maximum at 2412595, whereas the Rousdon maximum falls some 23 days later. The period at E = 33 according to the formula should be

$$429{\cdot}5+25\,(\sin 135^\circ-\sin 120^\circ)$$
$$=429{\cdot}5-4{\cdot}0=425{\cdot}5$$

The corrections to period shown by the different columns of the Rousdon observations are so consistent that it is difficult to believe that the mean result can be so erroneous as the formula would make it. If the formula were altered to

$$2398404+431\,E+30\sin(12^\circ E+9^\circ)$$

then for E = 33 the maximum would fall at 2412645, and the period would be

$$431+30\,(\sin 36^\circ-\sin 24^\circ)=436{\cdot}4$$

but it is of course impossible to alter the formula definitively without discussing other observations.

Summary of Comparisons with Chandler's Formulæ.

161. We may now collect the results of the foregoing discussions. The Rousdon observations have been used so as to furnish for each star two elements :

(1) An *epoch of maximum* at about the mean epoch of the Rousdon observations. This will not be sensibly affected by any error in assumed period.

(2) A *period* at about the mean epoch of the Rousdon observations.

Both of these elements have been compared with the values they should have according to CHANDLER'S formulæ given in his "Third Catalogue of Variable Stars" (*A.J.* No. 379), and the comparisons are given in Table LI. For some of the stars the period shows a systematic change, and in these cases the interval between two consecutive maxima at the mean epoch of the Rousdon observations is given in the fourth column. The period deduced from observations is, of course, compared with this fourth column in the seventh column.

162. In some cases, notably in those of *S Cassiopeiæ* and *R Cassiopeiæ*, the formula certainly seems to be capable of improvement; and suggestions have generally been made in this direction, which will be found on reference to the Table indicated in the eighth column; but it is clearly impossible to make any proper revision of such formulæ without discussing other observations which would carry us beyond the scope of the present work.

[At the moment of going to press 1904 January 23, No. 553 of the *A.J.* has been received, giving CHANDLER'S revision of his formulæ. It is impossible to go through the preceding work again at present; and it is undesirable to delay further the appearance of this memoir. But it is satisfactory to note that some of the corrections made by CHANDLER have been anticipated.]

Table LI.

No. in 3rd Cat.	Star's Name.	Chandler's Period.		No. of Periods.	Obs.–Calc.		Reference to Table
		Mean.	At Epoch.		Maximum.	Period.	
					d	d	
107	T Cassiopeiæ... ...	445	...	20	+ 4	− 0·6	XVI & XXIII.
432	S Cassiopeiæ... ...	610·5	605·3	19	+55	+25·4	XXIV.
814	S Persei	...	...	...	...	...	XXV–XXVII.
1855	R Aurigæ	460·2	...	26	−15	− 6·0	XXVIII.
2100	U Orionis	375	...	8	0	− 0·6	XXIX.
2478	R Lyncis	380·0	...	22	−11	− 2·2	XXX.
3825	R Ursæ Majoris ...	302·1	304·2	53	−10	− 3·4	XXXI–II.
4511	T Ursæ Majoris ...	257·2	254·8	47	− 4	+ 0·5	XXXIII–V.
4557	S Ursæ Majoris ...	226·1	223·1	55	0	+ 1·6	XXXVI–VII.
5157	S Boötis	268·2	261·5	43	+20	+ 4·7	XXXVIII.
5190	R Camelopardi ...	269·5	...	34	+34	+ 3·8	XXXIX.
5504	S Coronæ	360·8	...	34	+ 3	+ 2·5	XL.
5948	R Ursæ Minoris ...	...	...	...	...	...	XLI.
5955	R Draconis	245·6	...	27	+ 5	+ 0·2	XLII.
6044	S Herculis	308·1	...	44	+22	+ 0·9	XLIII.
6449	T Draconis	...	...	...	...	...	XLIV.
7045	R Cygni	425·7	...	33	+23	+ 1·3	XLV.
7120	χ Cygni	406·02	406·2	116	+20	+ 0·8	XLVI.
7220	S Cygni	322·8	321·3	35	+17	+ 5·7	XLVII.
7609	T Cephei	387	...	21	−15	+ 1·9	XLVIII.
7779	S Cephei	484	...	21	+15	+ 5·8	XLIX.
8600	R Cassiopeiæ... ...	429·5	425·5	33	+23	+13·2	L.

Table LII.

Numerical Mean Residual for each Star.

Star's Name.	Table.	No. of Resid.	Mean Resid.	Star's Name.	Table.	No. of Resid.	Mean Resid.
T Cassiop. ...	XVI.	116	·23	S Coronæ ...	XL.	129	·42
S Cassiop. ...	XXIV.	90	·34	R Ursæ Minoris	XLI.	125	·18
S Persei ...	XXV.	50	·28	R Draconis ...	XLII.	209	·35
R Aurigæ ...	XXVIII.	116	·32	S Herculis ...	XLIII.	129	·45
U Orionis ...	XXIX.	107	·36	T Draconis ...	XLIV.	60	·31
R Lyncis ...	XXX.	90	·50	R Cygni ...	XLV.	97	·44
R Ursæ Majoris	XXXI.	180	·34	χ Cygni ...	XLVI.	110	·48
T Ursæ Majoris	XXXIII.	234	·44	S Cygni ...	XLVII.	56	·54
S Ursæ Majoris	XXXVI.	271	·28	T Cephei ...	XLVIII.	93	·35
S Boötis ...	XXII.	176	·53	S Cephei ...	XLIX.	130	·69
„ ...	XXXVIII.	183	·29	R Cassiop. ...	L.	136	·50
R Camelop. ...	XXXIX.	191	·38	...	...	...	...

163. We will now make an attempt to give a very rough idea of the trustworthiness of the determinations of period. If we form the numerical mean of the residuals in each of the Tables XVI–L. we get the results shown in Table LII.

These residuals contain several sources of systematic error mixed up with accidental errors : especially the errors of the curves and periods. This is seen clearly in the case of *S Boötis*, where an improvement in the period (though not even then the best that could have been made) reduces the mean residual from ±·53 to ±·29. It would require a rather elaborate investigation, which cannot be undertaken at present, to determine accurately the probable error of a single residual in the case of each star ; but a glance at the above Table tells us that it would probably be not less than ±0·25 for many of them. Adopting this value for the sake of illustration, the P.E. of a difference between two groups of 5 would be about ±0·15. Taking as a representative case a period of 300 days, an interval between the groups of 10 periods, and a value for $p-f$ of 1·5, the correction to period would have a P.E. of $\pm 0{\cdot}15 \times 5 \div 1{\cdot}5 = \pm{\cdot}5$ day ; and the mean of nine such determinations (assuming that 3 columns are too near maximum or minimum to be included) would be about ±·17 day. There will be considerable variation from these conditions in the different cases.

164. In two cases, those of *S Persei* and *R Ursæ Minoris*, CHANDLER gives no definite period—merely the note "Irregularly Periodic." Suggestions have been made in both cases for a law of periodicity which seems worth a trial. For *T Draconis*, discovered in 1894, CHANDLER can only record the first rough value of a period (569 days) deduced by HARTWIG. A period of 428·3 days is deduced from the Rousdon observations.

165. I cannot leave this part of the discussion without a word in recognition of the value of CHANDLER'S formulæ. Table LI. gives some idea of its importance as a guide to the discussion of observations ; but I venture to think that only those who have worked steadily through a score of cases as I have done can form a proper estimate of the generous labour and the skill represented by CHANDLER'S three catalogues of variable stars ; and we cannot but feel a pang of regret that he has been compelled to relinquish such work.

Nature of the Periodic Inequality.

166. In working with CHANDLER'S formulæ, the question forces itself on our attention : What is the physical meaning of the periodic term which occurs so often in the expression for the periodicity ? Thus for *S Cassiopeiæ* the formula is

$$2401583^{d} + 610^{d}{\cdot}5E + 50^{d} \sin (10°E + 50°)$$

indicating that maxima follow one another *on the average* at intervals of 610·5 days, but may be accelerated or retarded by as much as 50 days. I find no attempt to elucidate the matter in the introductions to the three Catalogues, though a list of such

cases is given. The following notes do not carry us very far, but may be worth recording.

167. One possible source of such terms may be mentioned only to be dismissed. In the case of short-period variables there is a well-known correction for the "light-equation" depending on the position of the Earth in its orbit. Since light takes 16 minutes to cross the Earth's orbit, some maxima will be accelerated, and others retarded by 8 minutes, if the star lies in the plane of the orbit; and this effect could be represented by a periodic term of the above form, but with coefficient not greater than 8 minutes, instead of 50 days. For long-period variables it would be practically impossible to detect such slight variations. But suppose the star itself is also revolving, in an orbit of large dimensions—could this revolution afford an explanation of terms with larger coefficients? We see at once that light must take 100 days to cross the orbit; and, further, the coefficient 10° tells us that the period of revolution is $36 \times 610{\cdot}5$ days. Hence the ratio of the velocity of light to that of the star must be as 7000 to 100, or the star must be moving at 2600 miles per second, which does not seem at all likely. The controlling mass would be enormous.

168. A more probable source of the periodic term is the existence of a secondary light curve, of much smaller amplitude than the main curve, and of rather different period. That this would produce the desired effect can be seen by elementary geometrical reasoning.

In Fig. 6 suppose that AB, CD are portions of the waves which are to be added together to form a compound light curve: and first suppose that they are straight

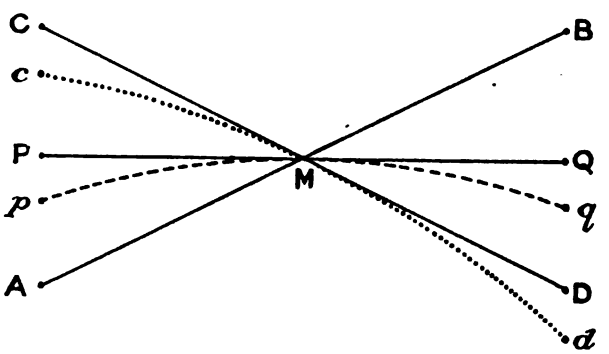


FIG. 6.

lines equally inclined to the horizontal time scale. Then they just neutralise each other at all points, and the result is the horizontal line PQ. Now, if either of them, CD, is replaced by a curved line *cd*, which falls below CD at the ends, the compound wave *pq* will fall by the same amount below PQ at the ends, and we shall have a maximum at the crossing point M. But if the two slopes are not equal at the crossing point, we do not of course get a maximum.

169. Now suppose (Fig. 7) that we have to consider the effect of a small wave (*i.e.* small in amplitude) W_1 on a large wave W_2. A maximum of the combination

will occur, by the above rule, when the two waves have equal slopes in opposite directions. Thus if RS be a portion of the small wave which is of equal slope to that of the large wave, then the maximum, which in the undisturbed large wave would

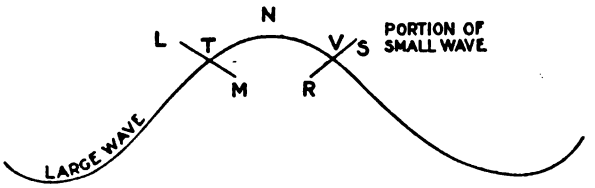


FIG. 7.

have been at N, will be retarded to V ; or if the small wave is in the opposite phase so as to slope as at LM, the maximum will be anticipated as at T. The greatest alteration in the date of maximum thus gives the greatest slope of the small wave.

170. The *period* of the small wave is given by the consideration that it advances during each period of the large wave by a fraction represented by the coefficient of E in the periodic term. This, however, does not give the period absolutely ; it only indicates a series of values from which we may be enabled to select by other considerations : for we have the sign of the coefficient (or the epoch $+50°$, which amounts to the same thing) still to select. Thus in the case of *S Cassiopeiæ* the coefficient 10° only indicates that the period of the small wave should be either $\frac{29}{30}$ or $\frac{31}{30}$ of the main period, 410 days. Or it may have a period about *half* its value or any other submultiple. Or it may have itself the actual period of 36×611 days.* In fact the interfering wave which has advanced in phase slightly between two maxima of the main wave, may in the meantime have also gone through n periods, where n may have any of the values 0, 1, 2, 3. . . . And of course the interfering wave may be made up of a series of harmonics so as to combine several of these values of n. We are thus led directly to the suggestion of harmonic analysis ; and in what follows a preliminary analysis has been attempted. It lacks much in completeness owing to pressure of other work and the necessity for printing off these results without further delay ; but some interesting results are indicated, and it is hoped to undertake a more complete discussion in the future.

171. All the light curves for the stars observed at Rousdon (except those of *S Persei*, *R Ursæ Minoris*, and *S Cygni*) were first analysed harmonically as follows : Taking the curves drawn as described in § 116, the magnitudes at maximum and at eleven subsequent epochs at intervals of one-twelfth of the adopted period were read off from the curve. The numbers are somewhat different from those given in Tables XVI. to L., where the epochs, though separated by the same intervals, start from an arbitrary zero and not from maximum ; but they refer to the same curves,

* In §§ 134 and 135 it was shown to be probable that such a wave of long period exists in the case of *S Persei*.

except that for *S Cassiopeiæ* and *R Lyncis* the minimum was drawn in by estimation instead of being left flat as in Tables XXIV. and XXX.

The reading for maximum was then subtracted from all these readings, so as to bring them to the same zero ; and the differences were then divided by the extreme difference, so as to bring them approximately to the same scale. The results are given in Table LIII. ; the constant subtracted being shown in the 10th column, and the divisor in the 11th column of Table LIV.

TABLE LIII.

Mean Light Curves.

—	Max.	2	3	4	5	6	7	8	9	10	11	12
T Cass. ...	000	·159	·403	·633	·906	·985	·779	·476	·333	·318	·245	·103
S Cass. ...	000	·102	·250	·451	·664	(·870)	(·966)	(·966)	(·870)	·651	·445	·165
R Aurigæ ...	000	·134	·329	·567	·782	·959	1·008	·788	·516	·437	·387	·168
U Orionis ...	000	·083	·236	·433	·626	·783	·916	1·002	·990	·840	·624	·269
R Lyncis ...	000	·083	·257	·453	·655	(·866)	(·995)	(·903)	·616	·394	·266	·083
R Ursæ Maj.	000	·082	·216	·390	·588	·781	·924	1·003	·981	·842	·447	·086
T Ursæ Maj.	000	·076	·214	·412	·614	·773	·926	1·007	·939	·690	·350	·076
S Ursæ Maj.	000	·058	·192	·442	·670	·853	·984	·865	·534	·247	·145	·047
S Boötis ...	000	·071	·224	·473	·757	·942	1·005	·873	·573	·305	·137	·037
R Camelop.	000	·064	·243	·460	·655	·863	1·000	·884	·661	·399	·208	·073
S Coronæ ...	000	·048	·172	·322	·468	·622	·766	·912	1·002	·734	·324	·036
R Draco ...	000	·070	·268	·492	·754	·920	1·007	·971	·799	·539	·243	·051
S Herculis...	000	·095	·325	·540	·838	·994	·944	·756	·595	·474	·227	·066
T Draco ...	000	·079	·213	·375	·542	·709	·867	·984	·888	·646	·379	·125
R Cygni ...	000	·108	·264	·418	·574	·728	·918	1·016	·918	·644	·380	·108
χ Cygni ...	000	·088	·255	·483	·678	·869	·998	·995	·795	·565	·327	·093
T Cephei ...	000	·157	·394	·629	·870	1·024	·979	·783	·523	·376	·335	·116
S Cephei ...	000	·088	·275	·513	·751	·930	·976	·859	·638	·571	·346	·104
R Cass. ...	000	·128	·302	·423	·471	·705	·927	1·009	·953	·803	·577	·206

172. The columns of Table LIII. were then multiplied by sin 0°, sin 30°, sin 60° &c. to get A ; by cos 0°, cos 30°, cos 60° &c. to get B ; and so on, A, B, C, D, E, F being the coefficients in the expression

$$M + A \sin\theta + B \cos\theta + C \sin 2\theta + D \cos 2\theta + E \sin 3\theta + F \cos 3\theta$$

which was assumed to represent each curve. The values of six times A, B, C, D, E, F are given in Table LIV. The factor 6 comes into all the numbers, and it was thought needless to divide out by it, as the scale is purely arbitrary.

Table LIV.

Harmonic Analysis of Mean Light Curves arranged in Order of Values of A.

Group.	Name.	Chandler's Number.	6A.	6B.	6C.	6D.	6E.	6F.	Constant.	Divisor.	Redness.
I.	T Cassiopeiæ ...	107	+1·23	−2·11	−·75	−·25	+·25	−·19	7·53	3·3	7·3
I.	T Cephei ...	7609	+0·75	−2·64	−·42	−·05	+·03	−·32	6·37	3·2	6·3
I.	S Herculis ...	6044	+0·50	−2·76	−·31	−·11	+·20	−·06	7·64	4·4	5·6
II.	S Boötis ...	5157	+0·46	−2·97	−·12	+·34	−·07	−·04	8·92	3·8	2·8
II.	R Aurigæ ...	1855	+0·38	−2·55	−·47	+·02	+·01	−·43	7·40	5·6	6·5
II.	S Ursæ Majoris	4557	+0·35	−2·81	−·06	+·44	−·20	−·12	7·88	3·6	3·2
III.	R Lyncis ...	2478	+0·07	−2·76	−·01	+·21	−·10	−·25	7·92	5·4	4·8
III.	R Camelopardi	5190	+0·07	−2·83	+·05	+·21	−·09	−·14	8·25	4·8	2·1
III.	S Cephei ...	7779	0·00	−2·74	−·23	−·12	+·11	−·21	8·84	2·4	9·1
III.	R Draconis ...	5955	−0·08	−3·06	+·12	−·05	+·02	+·04	7·61	4·7	2·0
III.	χ Cygni ...	7120	−0·31	−2·90	+·14	−·06	−·05	−·11	5·87	7·5	6·5
IV.	S Cassiopeiæ ...	432	−0·63	−2·74	+·04	−·20	+·04	−·13	8·27	5·2	6·7
IV.	R Cygni ...	7045	−0·77	−2·66	+·45	−·23	−·06	−·07	7·78	5·0	6·0
IV.	T Ursæ Majoris	4511	−0·80	−2·83	+·37	−·27	−·04	+·06	7·57	5·3	2·0
IV.	T Draconis ...	6449	−0·88	−2·58	+·35	−·22	−·05	−·03	8·20	2·4	?
V.	R Ursæ Majoris	3825	−1·11	−2·78	+·33	−·05	+·23	−·02	8·08	4·4	1·6
V.	S Coronæ ...	5504	−1·15	−2·51	+·59	−·46	+·13	+·21	7·39	5·0	4·9
V.	R Cassiopeiæ ...	8600	−1·23	−2·40	+·38	−·43	·00	−·38	6·45	4·6	6·5
V.	U Orionis ...	2100	−1·26	−2·54	+·01	−·53	·00	−·16	6·91	4·2	7·0

173. By retaining the factor 6 we get numbers not differing extravagantly from magnitudes tenths and hundredths, which serves to remind us of the difficulties in being certain about the smaller quantities; but, on arranging them as above in order of the coefficient A, it is seen at a glance that there is a certain run in all the columns. To reduce the accidental errors let us group the observations as indicated in the first column, and we have

Table LV.

Group.	6A.	6B.	6C.	6D.	6E.	6F.
I.	+0·83	−2·50	−·49	−·14	+·16	−·19
II.	+0·40	−2·78	−·22	+·27	−·09	−·20
III.	−0·05	−2·86	+·01	+·04	−·02	−·13
IV.	−0·77	−2·70	+·30	−·23	−·03	−·04
V.	−1·19	−2·56	+·33	−·36	+·09	−·09

174. As regards B it is only natural that it should depend on A, since A^2+B^2 has been made roughly constant; but there is less reason for the striking sequence in

C and D. At first sight the value of D for Group I. seems anomalous, but by converting the expression into the form

$$-H_1\cos(\theta-G_1)+H_2\cos(2\theta-G_2)-H_3\cos(3\theta-G_3)$$

we remove the anomaly. For we have

$$\tan G_1 = A/B \qquad \tan G_2 = C/D \qquad \tan G_3 = E/F$$

and the following are the values of G_1, G_2, and G_3:

TABLE LVI.

Group.	G_1.	G_2.	G_3.	$6G_1$.
I.	$-18^\circ\cdot4$	-106°	-40°	-110°
II.	− 8·1	− 40	+ 25	− 49
III.	+ 1·0	+ 14	+ 8	+ 6
IV.	+16·0	+127	+ 37	+ 96
V.	+24·9	+137	− 45	+149

whence it becomes clear that $G_2 = 6G_1$ very nearly. The values of $6G_1$ are added for comparison. As regards the values of G_3, they are clearly much more uncertain, particularly the later ones. It would not be difficult to establish some such relationship as $G_3 = 12G_1$ by adding multiples of 360° to the angles tabulated (which are the smallest numerically satisfying the conditions), but the material is not sufficient to warrant formulating any hypothesis at this stage.

175. Proceeding to the determinations of the H's from the equations

$$H_1^2 = A^2+B^2, \qquad H_2^2 = C^2+D^2, \qquad H_3^2 = E^2+F^2.$$

we have

TABLE LVII.

Group.	$-6H_1$.	$+6H_2$.	$-6H_3$.	G_1.
I.	−2·63	+·51	−·25	$-18^\circ\cdot4$
II.	−2·81	+·35	−·22	− 8·1
III.	−2·86	+·04	−·13	+ 1·0
IV.	−2·81	+·38	−·05	+16·0
V.	−2·82	+·49	−·13	+24·9

It seems certain that H_2, and probable that H_3, is related to G_1. What the exact relationship is, however, is not quite so clear, and we must accumulate more observations.

176. As regards physical peculiarities of the star, it seems possible, from the column "Redness" quoted in Table LIV. from CHANDLER'S Third Catalogue, that the redness may be connected with the phenomenon which determines G_1. If we omit two notable

exceptions, *S Cephei* and *R Ursæ Majoris*, the extreme groups I. and V. are redder than the intermediate groups. There is some reason for considering *R Ursæ Majoris* an exception, for in § 187 it is shown that the differences between Rousdon and Harvard would class it with the very red stars. But no reason can at present be assigned for omitting *S Cephei*, and the indication of relationship is thus very doubtful.

177. But if the relations among the constants A, B, C, D, E should turn out to be well founded, we clearly have good hopes of identifying any "disturbing" waves, even in their smaller harmonics. We proceed now to analyse the residuals for one or two of the stars which show well-marked periodic terms; and first we may take *S Ursæ Majoris*, since it is not only well observed but has a well-determined periodic inequality. Taking the sums of residuals for five consecutive periods given in § 144 and analysing them after dividing by 5 to get means, we obtain the following values for the coefficients A, B, C, D, E, F:

TABLE LVIII.

S Ursæ Majoris.

Coefficients of Harmonics at Intervals of 5 Periods.

Julian Date of Zero.	A.	B.	C.	D.	E.	F.
1277	+ ·05	− ·30	−·01	+·01	−·04	−·05
2402	·00	− ·14	·00	−·07	·00	+·03
3527	− ·10	− ·02	−·05	−·03	+·08	+·05
4652	+ ·02	+ ·15	−·10	+·01	+·10	+·12
Mean	− ·01	− ·08	−·04	−·02	+·04	+·04
Curve	+1·35	−1·05	−·28	−·04	+·12	−·02

178. The coefficients for the curve differ from those given in Table LIV. because we have reckoned from the arbitrary zero of Table XXXVI. instead of from maximum; and, further, we have not divided by the factor 3·2. But this need not concern us here. It is convenient, however, to refer our results to the mean values obtained by adding the two bottom lines as follows:

TABLE LIX.

S Ursæ Majoris.

Coefficients of Harmonics referred to Mean Rousdon Epoch.

Julian Date of Zero.	Value of E.	A.	B.	C.	D.	E.	F.
1277	48	+ ·06	− ·22	+·03	+·03	−·08	−·09
2402	53	+ ·01	− ·06	+·04	−·05	−·04	−·01
3527	58	− ·09	+ ·06	−·01	−·01	+·04	+·01
4652	63	+ ·03	+ ·23	−·06	+·03	+·06	+·08
Corrected Curve	...	+1·34	−1·13	−·32	−·06	+·16	+·02

179. There is a progressive change in the coefficients. We have to examine how far this can be explained by the co-existence of two waves with slightly different periods; and we can consider the harmonics separately. Let us take first the pair A, B, and suppose they are made up of two waves

$$m = A_0 \sin\theta + B_0 \cos\theta + A_1 \sin\phi + B_1 \cos\phi$$

the period of both θ and ϕ being nearly the same as that assumed. First, suppose that the period of θ is *exactly* that assumed, but that ϕ has a slightly different period.

180. We may suppose that the difference between ϕ and θ, instead of accumulating continuously, increases in jumps at the end of each period; so that for the mean period we write $\phi=\theta$; but for the one preceding we have $\phi=\theta-\alpha$, and for the one following we have $\phi=\theta+\alpha$. The number of groups being even, the mean period is not actually represented in Table LIX.; those given in the Table correspond to

$$\phi = \theta-3\beta, \qquad \phi = \theta-\beta, \qquad \phi = \theta+\beta \text{ and } \phi = \theta+3\beta$$

where $2\beta=5\alpha$; since there are 5 periods between each group.

181. When $\phi=\theta+\beta$ we have

$$m_3 = (A_0+A_1\cos\beta-B_1\sin\beta)\sin\theta+(B_0+B_1\cos\beta+A_1\sin\beta)\cos\theta$$

and similarly for m_1, m_2, and m_4, which correspond to other values of ϕ. Hence, taking the mean of the four, we have from Table LIX.:

$$+1\cdot34 = A_0+\tfrac{1}{2}A_1(\cos\beta+\cos 3\beta)$$
$$-1\cdot13 = B_0+\tfrac{1}{2}B_1(\cos\beta+\cos 3\beta)$$

and

$$+\cdot03-\cdot09-\cdot01-\cdot06 = -2B_1(\sin\beta+\sin 3\beta)$$
$$+\cdot23+\cdot06+\cdot06+\cdot22 = +2A_1(\sin\beta+\sin 3\beta)$$

In the case of *S Ursæ Majoris*, if we put $\alpha=+5^\circ\cdot76$ from CHANDLER'S formula, then $\beta=+14^\circ\cdot4$

$$\sin\beta+\sin 3\beta = \cdot933, \qquad \cos\beta+\cos 3\beta = 1\cdot698$$

and then

$$A_1 = +0\cdot31, \qquad B_1 = +0\cdot07$$
$$A_0 = +1\cdot08, \qquad B_0 = -1\cdot19$$

Hence

$$(A_1^2+B_1^2)^{\frac{1}{2}} = 0\cdot32, \qquad (A_0^2+B_0^2)^{\frac{1}{2}} = 1\cdot61,$$

or the amplitudes of the two waves are about in the ratio of 5 to 1.

182. But now comes a difficulty. If the period of θ is not *exactly* that of the curve assumed, part of the change in A and B will be due to the error in period of θ, and it is not immediately obvious how to separate the two contributors. If, for instance, CHANDLER'S mean period of 226·1 days be correct for the main wave, the assumed period of 225 days is in error, and the error will be 5·5 days in five periods, represented by an angle of $360^\circ\times 5\cdot5/225=8^\circ\cdot8$.

Hence, instead of A_0 and B_0 remaining constant, they will change slowly. The changes are represented by expressions similar to those written down, if A_0 and B_0 be substituted for A_1 and B_1, and $\gamma = -4^\circ\cdot4$ be substituted for β. And now we have

$$-\cdot13 = -2B_1(\sin\beta + \sin 3\beta) - 2B_0(\sin\gamma + \sin 3\gamma)$$
$$+\cdot57 = +2A_1(\sin\beta + \sin 3\beta) + 2A_0(\sin\gamma + \sin 3\gamma)$$

Since

$$\sin\gamma + \sin 3\gamma = -\cdot305 = -\cdot327(\sin\beta + \sin 3\beta)$$

the effect on A_1 and B_1 is to increase them by nearly one-third of A_0 and B_0; too large a quantity to deal with by approximations, and we must solve the set of simultaneous equations

$$A_0 + \cdot85A_1 = +1\cdot34 \qquad -\cdot61A_0 + 1\cdot87A_1 = +\cdot57$$
$$B_0 + \cdot85B_1 = -1\cdot13 \qquad 0\cdot61B_0 - 1\cdot87B_1 = -\cdot13$$

The values come out

$$A_1 = +\cdot58 \quad B_1 = -\cdot24 \quad A_0 = +\cdot86 \quad B_0 = -0\cdot95 \quad (A_1^2 + B_1^2)^{\frac{1}{2}} = 63 \quad (A_0^2 + B_0^2)^{\frac{1}{2}} = 1\cdot28$$

so that the amplitudes are now in the ratio of 2 to 1, which is a very different thing. If this were the case, the average range of 3 magnitudes should sometimes be extended to $4\frac{1}{2}$ and sometimes drop to $1\frac{1}{2}$, which is not in accordance with observations. The former ratio of 5 to 1 is much more in accord.

183. From the variations in brightness at maximum and minimum we may be able definitely to separate the components which go to make up the whole variability; but it is obvious that we are in face of a problem of some complexity, which will require the careful discussion of all the material available, and not merely of one set of observations; and such a discussion cannot be entered upon here. We may, however, before leaving the point, tabulate the changes in the coefficients of the harmonics for three other stars which have periodic terms and have been sufficiently observed to show definite changes.

TABLE LX.

Julian Date of Zero.	A.	B.	C.	D.	E.	F.
			R Ursæ Majoris.			
1539	+ ·06	− ·06	− ·11	− ·04	− ·02	·00
3039	+ ·10	− ·04	+ ·14	+ ·05	− ·07	·00
4539	− ·21	+ ·08	− ·08	− ·02	− ·01	− ·11
Mean	− ·02	− ·01	− ·02	·00	− ·03	− ·04
Curve... ...	−1·39	−1·73	+0·03	−0·42	+0·10	+0·22

TABLE LX—*continued.*

Julian Date of Zero.	A.	B.	C.	D.	E.	F.
			T Ursæ Majoris.			
0837	+ ·17	− ·26	− ·14	+ ·15	+ ·19	− ·05
1605	+ ·01	− ·45	− ·01	+ ·19	− ·01	− ·05
2373	+ ·38	− ·76	− ·02	+ ·21	+ ·23	+ ·06
3141	+ ·11	− ·28	− ·06	− ·01	− ·07	− ·12
3909	+ ·05	− ·05	− ·07	− ·07	+ ·16	− ·02
4677	+ ·09	+ ·36	− ·06	+ ·00	+ ·12	− ·02
Mean	+ ·14	− ·24	− ·06	+ ·08	+ ·10	− ·03
Curve... ...	+2·48	+0·70	−0·32	−0·17	+0·03	+0·02
			S Boötis.			
1360	− ·37	+ ·03	− ·13	− ·14	+ ·03	+ ·10
2161	− ·27	− ·44	+ ·14	− ·08	+ ·10	+ ·04
2962	− ·05	− ·09	− ·05	− ·14	− ·03	+ ·08
3763	·00	− ·03	− ·04	− ·05	+ ·01	+ ·01
4564	+ ·20	− ·08	+ ·08	− ·08	− ·06	− ·01
Mean	− ·10	− ·12	·00	− ·10	+ ·01	+ ·04
Curve... ...	−0·39	−1·87	+0·10	+0·19	−0·03	+0·02

184. *Comparison with Harvard.*—In the last column of the printed observations a comparison has been made with Harvard; and to show this in a more compendious form, the differences have been grouped in the same manner as for comparison with the mean light curve, and are given below.

185. The question arises, what importance are we to attach to the *systematic* differences between Rousdon and Harvard, as indicated by the means, often amounting to several tenths of a magnitude, of the different columns? At first it was thought that a general law of personal equation might be found, applicable to all stars, though perhaps the "redness" of the variable might come in as a factor. But the curious case of *T Cephei* seems to make it doubtful whether the number of disturbing factors is not too great to deal with. By reference to Table LXXII. it will be seen that the difference between Rousdon and Harvard is not even always the same for the *same star at the same magnitude*, but differs according as the star is waxing or waning. One is inclined to suspect some blunder here, but on examination none has yet been found. If the difference is due, as seems possible, to some difference in the physical appearance of the star on the rise and fall, it is eminently worth noting, and suggests a very careful and elaborate discussion of the differences between observers. Professor PICKERING

has already done some work in this direction at Harvard, and it may be hoped that it will be continued. Meanwhile *T Cephei* seems to be the only striking case of the kind, but it is the more puzzling because the star is regarded by Mr. GROVER as particularly well defined and easy to observe.

186. Of *S Cygni* there are few observations, and the magnitude of *S Persei* varies little. *R Ursæ Majoris* is anomalous, and will be treated separately. The other stars, observed both at Rousdon and Harvard, fall into two groups according to the "redness" given by CHANDLER in the 3rd Catalogue as follows:

(A) *Very Red Stars.*		(B) *Reddish Stars.*	
T Cassiopeiæ	7·3	T Ursæ Majoris	2·0
S Cassiopeiæ	6·7	S Ursæ Majoris	3·2
R Aurigæ	6·5	S Boötis	2·8
T Cephei	6·3	R Camelopardi	2·1
S Cephei	9·1	R Draconis	2·0
R Cassiopeiæ	6·5		
Mean Redness	7·1	Mean Redness ...	2·4

187. Collecting then from the Tables XVII. and LXI. to LXX. the "Corrections to Harvard" in groups according to the Rousdon magnitude given at the foot of each Table, we give the following values:

Rousdon Mag.	6·5	7·5	8·5	9·5	10·5	11·5	12·5
Corr. to Harv. (A) ...	$+·63_3$	$+·27_9$	$-·08_{17}$	$-·33_{15}$	$-·55_{12}$	$-·66_{10}$	$-1·14_5$
Corr. to Harv. (B)		$-·04_5$	$-·01_{13}$	$+·01_{10}$	$-·06_9$	$·00_9$	$+·15_{12}$

It seems clear that, while for moderately red stars, as in Class (B), the Harvard and Rousdon observers agree closely, for stars of conspicuously red colour, as in Class (A), they differ progressively by as much as 0·3 per magnitude! This personal equation far exceeds any systematic error discussed in this *Memoir*, and seems to demand the most careful investigation, if series of observations by different observers are to be combined. There is, however, a good deal that is still obscure, especially the line at which personal equation becomes sensible. The mean redness for Class (B) according to CHANDLER'S 3rd Catalogue is 2·4; and yet *R Ursæ Majoris*, for which a redness of only 1·6 is recorded, shows differences between Rousdon and Harvard sensibly agreeing with Class (A). It is to be remembered that the Harvard observations were made by several observers, and the series is thus complex. Further, the exceptional case of *T Cephei* may throw some light on the question. For the present, in any case, the discussion must be terminated here; but the following Tables contain material which will no doubt be useful to others who may be able to continue it.

188. The Tables which follow are similar to Table XVI. already given for *T Cassiopeiæ*, to which reference may be made for any requisite explanations.

Table LXI. S Cassiopeiæ. Redness 6·7.
Corrections to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	52	104	156	208	260	312	364	416	468	520	572
0994	...	...	...	+·1	·0	−·3	−·3	−·5	−·4	−·3	−·3	−1·0
1618	−1·9	−1·9	...	−·7	−·6	·0	·0	+·1	·0	+·1	−·6	−1·1
2242	−1·8	−2·1	−2·0	−·9	·0	−·7	+·1	...	...	−·5	−·7	−·1
2866	−1·0	−1·4	·0	−·2	−·3	−·2	+·4	+·1	−·3	−·4	−·3	−·8
3490	−1·1	...	−1·6	...	−1·4	−·6	−·2	−·1	+·2	−·2	−·7	−·7
4114	...	...	...	...	−·3	−·1	...	...	...	−·4	...	...
Means ...	−1·5	−1·8	−1·2	−·4	−·4	−·3	·0	−·1	−·1	−·3	−·5	−·8
Rousdon Mag.	12·6	12·4	12·6	11·9	11·0	9·6	8·3	8·6	9·2	10·3	11·4	12·3

The residuals deduced from "numbered" comparison stars have been diminished by 0·2. See § 99.

Table LXII. S Persei. Redness 5·0.
Corrections to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	70	140	210	280	350	420	490	560	630	700	770
1252	...	...	...	...	...	...	...	...	...	...	−·1	+·1
2092	·0	·0	+·1	+·1	·0	+·2	+·4	+·4	+·5	·0	+·1	+·2
2932	+·2	+·2	+·2	+·2	+·2	+·1	−·3	−·2	·0	+·3	+·3	+·1
3772	+·2	+·2	+·6	+·2	−·2	−·2	+·1	+·1	+·4	−·3	·0	+·2
4612	+·1	+·5	+·1	+·1	+·4	+·2	...	...	...	...	...	...
Means ...	+·1	+·2	+·3	+·2	+·1	+·1	+·1	+·1	+·3	·0	+·1	+·2
Rousdon Mag.	8·6	8·7	8·9	9·1	9·4	9·6	9·7	9·7	9·4	9·0	8·6	8·5

Table LXIII. R Aurigæ. Redness 6·5.
Corrections to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	38	76	114	152	190	228	266	304	342	380	418
1019	...	−·4	−·1	−·4	−·1	−·4	−·5	−1·2	...	...	−1·0	−·8
1475	−·7	+·2	−·4	−·2	−·2	−·1	+·5	−·5	−1·1	−1·3	−1·0	−1·1
1931	−·6	+·2	+·4	+·2	+·1	−·3	−·4	−·9	...	...	−·6	−·6
2387	−·1	−·1	·0	+·1	+·1	·0	...	...	...	+·1	+·1	−·5
2843	+·1	·0	·0	+·1	−·1	−·3	−·6	−·5	+·3	+·5	+·1	−·7
3299	+·4	·0	−·4	−·1	−·3	·0	−·2	·0	...	...	−·5	−·9
3755	−·3	+·7	+·1	·0	−·1	−·1	−1·6	−1·5	...	...	...	−·2
4211	−·5	−·3	−·5	−·1	·0	−·3	...	...	...	...	...	...
4667	...	...	...	−·1	...	...	...	...	...	...	...	...
Means ...	−·2	·0	−·1	·0	−·1	−·2	−·5	−·8	−·4	−·2	−·5	−·7
Rousdon Mag.	9·8	9·7	8·3	7·3	8·2	9·2	10·5	11·8	12·7	13·2	11·9	10·2

TABLE LXIV.

R Lyncis. Redness 4·8.

Corrections to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	32	64	96	128	160	192	224	256	288	320	352
1910	...	...	...	...	...	...	...	...	...	(− ·3)	(+ ·3)	(+ ·4)
2294	(− ·4)	(− ·8)	...	(−1·4)	(−3·0)	(−3·6)	(−3·4)	+ ·2	+ ·4	+ ·1	− ·1	− ·1
2678	...	·0	·0	+ ·1	+ ·1	...	− ·4	− ·5	− ·5	− ·3	− ·6	− ·1
3062	− ·3	− ·5	+ ·1	+ ·4	·0	+ ·6	− ·9	− ·4	+ ·1	− ·1	− ·6	...
3446	...	...	...	...	·0	·0	− ·3	+ ·1	− ·2	...	...	...
3830	− ·3	·0	+ ·1	...	...	+ ·3	− ·4	− ·1	+ ·1	...	...	...
4214	+1·1	+ ·6	+1·1	...	...	+ ·3	− ·6	+ ·3	− ·4	...	...	+ ·3
4598	+ ·3	...	...	...	...	...	− ·2	− ·3	...	...	...	− ·3
4982	− ·6	...	...	...	...	...	...	...	...	...	...	...
Means ...	·0	·0	+ ·3	+ ·2	·0	+ ·3	− ·5	− ·1	− ·1	− ·1	− ·4	·0
Rousdon Mag.	9·9	10·9	12·0	12·0	12·0	12·0	10·3	10·0	8·7	8·0	8·1	8·9

TABLE LXV.

R Ursæ Majoris. Redness 1·6.

Corrections to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	25	50	75	100	125	150	175	200	225	250	275
0939	...	...	...	...	+·2	−·2	+·1	−·2	−·1	−·4	+·1	−·2
1239	+ ·9	+ ·5	+·5	·0	+·3	·0	−·4	−·5	−·3	−·2	−·2	−·1
1539	+1·2	+ ·6	+·5	+·2	−·2	(−·4)	−·5	−·5	−·3	(−·2)	−·1	+·3
1839	+ ·6	+ ·7	+·7	+·5	−·4	−·7	−·5	−·3	−·2	−·3	+·2	+·2
2139	+ ·7	+ ·4	+·7	+·6	+·3	·0	(·0)	−·1	+·1	·0	−·1	+·4
2439	+ ·4	+ ·5	+·6	+·2	−·1	−·4	−·4	+·2	·0	−·2	+·3	+·4
2739	+ ·7	+ ·6	+·6	−·5	−·6	...	...	...	...	...	...	·0
3039	+ ·9	+1·0	+·8	+·4	+·2	−·2	−·4	+·3	+·8	+·4	+·1	+·4
3339	+1·5	+ ·9	+·6	+·4	+·1	−·5	...	...	...	-·4	·0	+·6
3639	+1·4	+ ·7	+·7	+·1	−·4	−·9	...	...	...	...	+·2	−·1
3939	+ ·6	+ ·8	+·5	(·0)	−·4	−·1	...	...	...	...	...	...
4239	...	+ ·3	+·2	−·1	−·3	−·4	−·6	−·2	−·5	−·4	...	...
4539	...	+ ·7	+·8	+·4	−·1	...	...	...	...	+·3	+·1	+·3
4839	...	...	...	...	+·1	+·1	·0	...	...	...	...	....
Means ...	+ ·9	+ ·6	+·6	+·2	−·1	−·3	−·3	−·2	−·1	−·1	+·1	+·2
Rousdon Mag.	8·2	8·2	8·8	9·4	10·2	11·1	11·9	12·5	12·5	12·2	11·3	9·1

The results from numbered comparison stars have been increased by +·1. See § 99.

TABLE LXVI.

T Ursæ Majoris. Redness 2·0.

Corrections to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date	0	21	43	64	85	107	128	149	171	192	213	235
837	...	...	...	...	...	...	...	...	...	...	...	·0
1093	·0	−·2	− ·1	...	+·2	·0	−·6	−1·2	−·3	−·2	+·1	·0
1349	+·2	−·6	+ ·1	− ·1	−·2	−·1	−·8	− ·2	+·3	+·2	+·5	−·2
1605	+·1	−·3	− ·1	+ ·3	−·4	−·2	+·1	+ ·3	+·4	+·1	−·1	−·5
1861	+·2	−·1	+ ·1	...	...	−·5	+·2	+ ·6	−·2	−·4	·0	+·2
2117	+·2	+·1	− ·5	− ·1	−·3	·0	+·3	− ·1	−·5	−·5	−·9	·0
2373	−·2	+·1	+1·0	+1·3	...	...	−·3	+ ·2	+·2	·0	...	...
2629	...	+·2	...	+ ·6	+·5	−·2	+·1	+ ·3	−·1	−·1	−·4	−·3
2885	·0	−·1	...	+ ·3	+·3	+·5	−·4	− ·3	+·5	+·2	−·6	−·6
3141	−·3	−·1	+ ·5	...	...	...	...	...	−·4	−·2	...	−·3
3397	...	−·6	...	...	...	...	+·8	+ ·4	+·3	+·2	+·1	+·1
3653	+·2	+·3	+ ·2	+ ·9	+·6	·0	+·2	+ ·4	+·3	+·2	+·3	...
3909	...	...	...	...	...	−·2	+·1	...	−·1	+·1	+·1	...
4165	...	...	...	...	...	...	+·3	− ·2	·0	+·1	+·2	·0
4421	−·4	...	...	...	...	...	...	− ·1	+·1	+·3	·0	+·1
4677	...	...	...	...	...	...	−·2	− ·7	−·4	+·1	+·1	+·2
Means ...	·0	−·1	+ ·2	+ ·5	+·1	−·1	·0	·0	·0	·0	·0	−·1
Rousdon Mag.	10·7	11·7	12·6	12·9	12·6	11·7	10·0	8·1	7·6	8·0	8·7	9·6

TABLE LXVII.

S Ursæ Majoris. Redness 3·2.

Apparent Correction to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	18	37	56	75	93	112	131	150	168	187	206
1052	...	...	−·5	+·8	+·4	+·3	− ·3	−·2	+·1	+·2	+·3	+·6
1277	+·2	+·3	+·4	+·6	+·2	+·3	− ·1	−·3	−·6	−·9	−·6	−·8
1502	−·4	+·1	−·2	−·1	·0	+·1	+ ·1	−·3	·0	+·1	+·2	−·1
1727	·0	+·3	+·9	+·3	+·2	−·2	+ ·1	−·1	−·2	+·3	−·1	−·1
1952	·0	−·0	−·1	−·1	+·3	+·9	+ ·8	+·1	(+·4)	+·6	−·1	−·3
2177	−·2	−·1	+·3	+·4	+·7	+·1	− ·2	−·4	−·2	+·3	−·4	·0
2402	−·2	(·0)	+·3	+·3	+·2	−·5	·0	−·4	−·4	·0	...	...
2627	...	...	...	+·1	+·2	·0	·0	·0	+·2	+·2	−·2	−·3
2852	−·6	−·5	−·4	−·3	(−·1)	+·1	− ·3	−·3	+·2	·0	(·0)	+·1
3077	·0	+·4	·0	+·2	+·4	+·4	− ·2	−·8	−·8	−·2	+·2	+·2

TABLE LXVII—*continued.*

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	18	37	56	75	93	112	131	150	168	187	206
3302	+·3	−·2	−·2	−·6	(−·5)	−·4	− ·4	·0	+·2	+·2	−·2	−·1
3527	−·4	−·4	−·4	−·2	−·3	+·2	− ·5	−·1	+·3	−·1	·0	·0
3752	+·3	+·3	+·2	−·2	−·9	− ·9	−1·2	−·5	−·5	+·1	−·2	−·1
3977	−·2	+·2	−·2	−·3	·0	·0	− ·9	(− ·6)	...	...	...	...
4202	...	...	...	...	...	...	+ ·1	− ·2	−·1	+·5	+·4	·0
4427	+·4	·0	−·3	...	...	...	...	+·4	+·4	+·5	+·4	+·2
4652	−·1	−·2	(·0)	+·2	+·3	+·3	− ·8	−·2	·0	+·4	+·1	+·1
4877	+·1	−·1	·0	+·3	...	...	...	...	...	...	...	...
Means ...	−·1	·0	−·1	+·1	+·1	·0	−·3	− ·2	−·1	+·1	·0	−·1
Rousdon Mag.	8·2	9·0	9·8	10·7	11·4	11·5	10·4	9·3	8·5	8·3	7·9	7·8

The results from "numbered" comparison stars should be diminished by ·1. See § 99. This was forgotten in forming the table, but has been taken account of in the means.

TABLE LXVIII.

S Boötis. Redness 2·8.

Corrections to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	22	44	67	89	111	133	156	178	200	222	245
1093	...	...	...	...	...	...	...	...	...	...	...	+·1
1360	+·3	+·2	+·1	−·2	− ·4	−·2	−1·0	−·5	...	− ·5	−·7	·0
1627	+·3	+·4	+·2	·0	+ ·5	+·3	− ·6	...	−·3	·0	...	+·2
1894	+·3	+·2	+·4	−·1	− ·1	−·7	− ·7	...	...	...	−·2	·0
2161	−·2	+·5	+·1	...	...	...	...	...	·0	+ ·3	+·1	+·6
2428	+·4	+·4	+·1	−·5	+1·0	+·6	+ ·6	+·6	...	...	...	−·1
2695	+·1	+·2	−·1	−·4	− ·4	·0	+1·2	+·3	+·5	+ ·1	−·3	−·2
2962	+·5	+·2	·0	−·4	...	−·4	...	...	...	− ·2	−·3	...
3229	...	...	...	+·5	+·2	+·3	...	...	...	− ·6	−·3	+·2
3496	+·3	+·3	+·3	+·5	+ ·1	+·3	− ·3	−·9	·0	− ·4	·0	+·1
3763	+·3	+·4	+·2	−·1	− ·3	+·2	+ ·5	...	+·6	+ ·3	+·6	+·4
4030	+·7	+·6	+·5	+·4	...	...	...	...	...	+1·0	+·2	+·1
4297	−·1	−·2	−·1	−·3	− ·2	...	...	...	...	...	...	...
4564	...	+·3	+·3	...	...	...	...	...	...	...	·0	+·1
4831	+·1	+·3	+·2	·0	− ·6	−·7	− ·4	−·2	...	...	...	...
Means ...	+·3	+·3	+·2	−·1	·0	·0	− ·1	−·1	+·2	·0	−·1	+·2
Rousdon Mag.	8·8	8·8	9·3	10·1	11·2	12·2	12·7	12·8	12·3	11·0	10·0	9·3

TABLE LXIX.
R Camelopardi. Redness 2·1.
Corrections to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	23	46	68	91	114	137	159	182	205	227	250
0856	...	...	...	...	...	...	...	...	...	...	− ·5	+ ·8
1129	...	−·2	·0	−·5	−·9	−·8	...	−·3	...	+·1	...	...
1402	+·5	−·2	+·2	+·3	−·3	−·6	−·2	−·3	+·2	...	...	+ ·5
1675	+·3	+·3	+·4	+·1	−·3	·0	+·3	+·4	...	+ ·4	...	− ·2
1948	·0	−·2	+·3	+·9	+·6	+·6	+·2	...	+·6	+ ·2	+ ·3	+ ·3
2221	+·8	+·2	+·2	+·3	−·2	−·2	−·2	−·2	−·1	+1·1	+ ·9	+ ·2
2494	...	...	−·1	...	...	−·2	...	...	...	− ·2	+1·0	+1·5
2767	+·9	+·5	+·2	...	−·1	−·1	−·4	...	−·1	+ ·1	...	+ ·4
3040	...	−·2	+·3	+·4	+·1	+·2	+·3	−·1	...	...	− ·2	+ ·5
3313	−·5	−·3	·0	·0	·0	+·1	−·2	−·1	·0	...	...	...
3586	...	−·3	·0	+·1	+·1	+·1	+·2	·0	−·3	− ·1	− ·4	...
3859	+·2	−·2	+·1	+·3	·0	+·3	−·2	...	+·1	...	...	...
4132	+·3	·0	+·2	+·1	−·3	−·3	−·4	+·1	+·1	− ·7	...	...
4405	+·1	−·4	−·1	−·2	·0	·0	−·3	·0	+·6	+ ·9	...	...
4678	...	·0	−·3	−·3	−·5	−·2	+·4	−·3	−·6	...	...	...
4951	...	+·5	·0	...	...	...	...	...	...	...	...	...
Means ...	+·3	·0	+·1	+·1	−·1	−·1	·0	−·1	+·1	+ ·2	+ ·2	+ ·5
Rousdon Mag.	12·1	10·2	9·4	8·8	8·3	8·4	9·0	10·1	11·2	12·2	13·1	13·1

TABLE LXX.
R Draconis. Redness 2·0.
Corrections to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	21	41	62	82	103	123	144	164	185	205	226
962	...	...	...	...	...	...	...	−·4	·0	−·2	−·9	−·5
1208	−·1	+·2	+·3	+ ·6	+·4	−·1	+·4	−·1	−·6	−·3	−·6	−·4
1454	−·1	...	+·4	+ ·6	+·1	−·1	−·2	+·1	−·2	+·1	−·2	−·1
1700	−·1	−·2	+·4	...	−·1	...	−·1	+·2	+·4	+·2	+·2	·0
1946	+·3	+·5	+·1	+ ·4	+·8	...	−·3	·0	...	−·9	−·7	−·1
2192	+·2	+·5	·0	...	+·4	−·1	...	−·1	·0	−·4	−·2	·0
2438	+·3	...	...	...	+·6	−·1	+·2	−·2	+·2	...	...	...
2684	−·3	+·4	...	+ ·3	+·4	−·3	+·1	...	·0	−·1	−·6	·0
2930	−·2	−·3	−·1	− ·1	−·3	+·2	+·1	−·2	+·1	−·2	·0	·0
3176	−·5	...	−·3	+ ·1	...	+·1	−·1	−·3	−·1	·0	−·2	+·1
3422	+·4	+·2	+·2	− ·1	−·4	−·5	−·3	+·2	+·9	+·4	...	−·1
3668	−·1	−·3	−·4	− ·2	−·2	−·1	·0	·0	+·6	−·2	−·1	·0
3914	·0	...	...	...	...	·0	·0	+·1	+·2	·0	...	...
4160	−·6	·0	+·6	+ ·6	+·3	...	...	...	−·2	−·2	−·2	·0

TABLE LXX—*continued.*

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	21	41	62	82	103	123	144	164	185	205	226
4456	−·1	...	·0	− ·3	+·1	−·7	...	−·6	−·2	+·3	+·1	+·5
4652	+·6	...	...	...	...	...	...	−·4	−·5	−·7	−·3	−·1
4898	...	...	...	...	+·4	+·1	...	...	...	...	...	...
Means	·0	+·1	+·1	+ ·2	+·2	−·1	·0	−·1	·0	−·1	−·3	−·1
Rousdon Mag.	10·3	11·5	12·0	12·5	12·0	11·0	9·7	8·4	7·7	7·7	8·2	9·2

TABLE LXXI. S Cygni. Redness 5·1.

Corrections to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	27	54	81	108	135	162	189	216	243	270	297
2124	...	...	...	...	...	...	...	...	...	−·5	+ ·8	+ ·4
2448	+·3	+·8	...	...	...	...	...	...	...	...	+ ·8	+ ·7
2772	−·4	−·3	...	...	...	...	...	...	...	+·1	...	+ ·2
3096	−·5	−·6	−1·4	...	...	...	...	...	...	−·1	− ·2	− ·4
3420	−·1	−·3	− ·5	...	...	...	...	...	...	−·6	− ·1	− ·4
3744	−·3	−·5	− ·1	...	...	...	...	...	...	...	− ·2	+ ·1
4068	−·1	−·3	− ·5	...	...	...	...	...	...	...	...	...
4392	+·1	−·4	− ·7	...	...	...	...	...	...	...	+1·8	+1·1
4716	·0	...	...	...	...	...	...	...	...	+·4	+ ·5	...
Means	−·1	−·2	− ·6	...	...	...	...	...	...	−·1	+ ·5	+ ·2
Rousdon Mag.	10·2	10·8	12·1	...	...	...	...	...	...	12·9	12·5	10·9

TABLE LXXII. T Cephei. Redness 6·3.

Corrections to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	32	64	96	128	160	192	224	256	288	320	352
1871	...	...	...	...	...	...	+·7	−·5	−·6	−·5	−·3	·0
2255	·0	+·2	− ·4	+·4	+ ·2	+ ·2	+·3	−·2	+·3	·0	+·1	+·5
2639	...	...	...	+·9	+ ·4	+ ·1	...	−·6	−·9	−·8	·0	−·4
3023	+·7	+·8	+1·1	+·7	+1·1	+ ·4	−·3	−·1	+·3	−·7	−·8	−·5
3407	+·3	+·6	+ ·6	+·1	+ ·4	− ·1	−·7	−·1	−·8	−·9	−·7	−·2
3791	·0	−·2	+ ·9	+·9	+ ·6	+ ·4	−·1	...	−·6	−·6	−·7	−·3
4175	+·3	+·9	+ ·3	+·8	...	+ ·8	+·3	−·3	−·1	−·2	− ·3	−·3
4559	+·3	+·8	(+ ·5)	(+·1)	+ ·4	+1·2	+·2	−·2	−·5	−·6	−·3	−·8
4943	+·1	+·9	+ ·3	...	...	...	...	...	...	...	...	...
Means ...	+·2	+·6	+ ·5	+·6	+ ·5	+ ·4	+·1	−·3	−·4	−·5	−·4	−·3
Rousdon Mag.	7·6	7·0	6·4	6·9	7·7	8·2	8·9	9·4	9·6	8·8	8·1	7·6

TABLE LXXIII.

S Cephei. Redness 9·1.

Corrections to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	40	80	120	160	200	240	280	320	360	400	440
1029	...	...	−1·3	− ·8	− ·8	−1·2	−1·2	− ·6	− ·7	−1·0	−1·2	−1·1
1509	−1·3	−1·1	− ·9	− ·5	− ·3	− ·3	− ·3	− ·9	− ·8	− ·6	−1·5	−1·1
1989	− ·4	−1·1	− ·6	...	·0	− ·4	− ·4	+ ·1	+ ·5	− ·5	− ·3	− ·7
2469	− ·5	− ·6	− ·2	·0	− ·2	− ·4	+ ·4	− ·2	− ·4	− ·5	− ·7	−1·4
2949	−1·1	− ·7	− ·1	− ·1	− ·1	− ·4	− ·6	− ·8	− ·4	− ·6	−1·3	−1·5
3429	− ·4	− ·2	− ·2	− ·2	+ ·2	·0	− ·7	−1·1	−1·6	−1·9	−1·1	− ·8
3909	− ·2	+ ·2	− ·1	+ ·3	·0	− ·4	− ·3	−1·0	−1·3	−1·7	−2·1	−2·0
4389	−1·1	− ·8	− ·6	−1·7	−1·1	·0	+ ·2	− ·1	− ·2	− ·9	− ·2	− ·6
4869	− ·1	+ ·1	− ·1	− ·2	...	...	...	...	...	...	...	...
Means ...	− ·6	− ·5	− ·5	− ·4	− ·3	− ·4	− ·4	− ·6	− ·6	−1·0	−1·1	−1·1
Rousdon Mag.	10·3	9·7	9·1	8·9	9·1	9·4	10·1	10·5	11·1	11·1	11·1	10·4

TABLE LXXIV.

R Cassiopeiæ. Redness 6·5.

Corrections to Harvard.

Group.	1	2	3	4	5	6	7	8	9	10	11	12
Julian Date.	0	36	72	108	144	180	216	252	288	324	360	396
0914	...	...	...	...	...	...	...	−1·3	− ·6	+·1	+ ·4	+ ·8
1346	+1·0	+ ·4	− ·3	− ·7	−·5	−·4	−·5	− ·7	− ·6	−·2	+1·0	+ ·7
1778	+ ·3	+ ·5	− ·1	− ·1	−·3	−·6	−·9	−1·4	−1·2	−·1	+ ·5	...
2210	+1·2	+ ·7	+ ·4	− ·1	−·4	−·4	−·5	− ·2	·0	+·9	+ ·2	...
2642	...	...	− ·2	− ·4	−·5	−·4	−·4	− ·5	− ·5	+·2	+ ·2	+1·3
3074	+1·2	+ ·5	·0	+ ·2	−·2	...	...	− ·3	...	−·3	+ ·1	+ ·6
3506	+1·1	+ ·2	+ ·2	− ·2	−·5	−·4	−·6	− ·8	− ·9	−·8	·0	+ ·3
3938	+ ·7	+1·1	...	...	+·2	−·1	−·6	− ·6	− ·7	−·5	− ·7	...
4370	...	...	− ·1	− ·4	−·8	−·4	−·7	− ·1	− ·6	−·7	− ·1	...
4802	...	...	+ ·7	+ ·5	−·1	−·4	...	...	...	...	...	...
Means ...	+ ·9	+ ·6	+ ·1	− ·1	−·3	−·4	−·6	− ·7	− ·6	−·2	+ ·2	+ ·8
Rousdon Mag.	7·0	7·6	8·2	8·8	9·6	10·7	11·1	11·0	10·6	9·6	8·0	6·6

The results from "numbered" comparison stars have been increased by +·2. See § 99.

POSTSCRIPT. 1904 March 24.

Chandler's Revised Elements.

In § 162 it was stated that No. 553 of the *Astronomical Journal*, containing the revision of the elements of the Third Catalogue, was received just as this Introduction was being sent to press, and it was impracticable to delay the printing at the time for incorporation of the revised elements. But a brief comparison can now be given.

For the following four stars of the Rousdon series CHANDLER still gives a simple period.

TABLE LXXV.

No.	Name.	Chandler's Period.		Rousdon Period.	R − Old.	R − New.
		Old.	New.			
		d.	d.	d.	d.	d.
107	T Cassiopeiæ	445	443·5	444·4	−0·6	+0·9
2100	U Orionis	375	375	374·4	−0·6	−0·6
5955	R Draconis	245·6	245·6	245·8	+0·2	+0·2
6449	T Draconis	(569)	426	428·3	...	+2·3
7609	T Cephei	387	387	388·9	+1·9	+1·9

[When the Third Catalogue was compiled *T Draconis* had only recently been discovered, and the erroneous period of 569 days was adopted from observations of two maxima only.]

For the following three stars CHANDLER gives provisionally a secular change in the period in his revised Catalogue.

TABLE LXXVI.

No.	Name.	Chandler's		Rousdon.		R − Old.	R − New.
		Old Formulæ.	New Formulæ.	E.	Mean Period.		
7045	R Cygni	425·7E	425·9E+0·01 E^2	30–35	427·0	+1·3	+0·4
7220	S Cygni	322·8E+15 sin (12°E+66°)	323 E+0·015E^2	33–38	327·0	+6·2	+2·9
7779	S Cephei	484E	485·8E+0·05 E^2	19–24	489·8	+5·8	+1·9

The values of E tabulated in the fifth column are those corresponding to the means of the groups from which the Rousdon period was deduced. Substituting these

values in CHANDLER'S formulæ, and dividing the difference by the number of periods elapsed, which in all the above cases is five, we get the values which are compared with Rousdon in the seventh and eighth columns. In all three cases the new formula suits the Rousdon results much better than the old, though in all three cases the improvement does not go far enough. This is what we might expect, seeing that CHANDLER has corrected his formulæ from observations made approximately at the same time as the Rousdon observations (viz. at Harvard), which tell nearly the same story as the Rousdon observations and suggest similar corrections; and it would be only natural to adopt some sort of compromise between the old formula and the suggested corrections.

There remain the stars for which CHANDLER gives a formula with periodic terms, which are much more numerous in his revised elements, although he has cut out *S Cygni* above. For the purposes of comparison it will be sufficient to take the mean period between the recorded values of E, as in the last table, instead of taking several periods for each star as in our previous work.

TABLE LXXVII.

Star's		Chandler's		Rousdon		R—Old.	R—New.
No.	Name.	Old Formula.	New Formula	E.	Period.		
					d.	d.	d.
432	S Cassiopeiæ	610·5E + 50 sin (10°E + 50°)	610·5E + 37 sin (15°E + 59°)	17- 21	630·7	+24·5	+11·3
1855	R Aurigæ	460·2E	458·6E + 19 sin (12°E + 228°)	22- 27	454·2	− 6·0	− 0·8
2478	R Lyncis	380·0E	379·2E + 14 sin (15°E + 270°)	20- 24	377·8	− 2·2	+ 0·4
3825	R Ursæ Majoris	302·1E + 15 sin (10°E + 190°)	302·1E + 11 sin (8°E + 238°)	46- 55	300·4	− 3·8	− 2·0
4511	T Ursæ Majoris	257·2E + 20 sin (9°E + 90°)	No change	41- 55	255·5	+ 0·7	+ 0·7
4557	S Ursæ Majoris	226·1 + 43 sin (5·°76E + 181°·5)	226·5E + 35 sin (5°·4E + 194°)	48- 63	224·5	+ 1·5	+ 0·1
5157	S Boötis	268·2E + 0·246E² − 0·005E³	270·0E + 60 sin (3°·6E + 358°)	40- 50	265·9	+ 6·1	− 0·6
5190	R Camelopardi	269·5	269·5E + 65 sin (4°E + 218°)	29- 39	273·3	+ 3·8	− 0·6
5504	S Coronæ	360·8	361·2E + 8 sin (12°E + 327°)	29- 38	363·3	+ 2·5	+ 0·7
6044	S Herculis	308·1	308·3E + 35 sin (9°E + 86°)	39- 49	309·0	+ 0·9	+ 3·3
7120	χ Cygni	406·02E + 0·0075E² + 25 sin (5°E + 272°)	No change	114-119	407·0	+ 0·8	+ 0·8
8600	R Cassiopeiæ	429·5E + 25 sin (15°E + 0°)	431·6E + 32 sin (9°E + 60°)	31- 36	438·7	+14·0	+ 2·2

Here again the change is always in the right direction, with the single exception of *S Herculis*. In the cases of *S Cassiopeiæ*, *R Aurigæ*, *S Boötis*, and *R Cassiopeiæ*, the improvement is conspicuous.

THE

ROUSDON OBSERVATIONAL RECORD

FOR

TWENTY-TWO VARIABLE STARS

OF LONG PERIOD.

Explanation of the Printed Observations.

The *first* column contains the civil date, and needs no further explanation.

The *second* column gives the Julian day after subtracting 2,410,000.

The *third* column gives the power of the eyepiece used on the telescope. When no power is specified, it is to be understood that power 34 was used. See §§ 9 to 16.

The next five columns contain the comparisons of the variable with the comparison stars. The sign − means that the variable was fainter than the comparison star, and an attempt is made to give the difference in tenths of a magnitude. For a discussion of the scale-value of these estimates see §§ 39 to 61. The differences are apparently about 0·2 in numerical excess, when they exceed about ±0·4. Lists of the comparison stars will be found in Table XI. on pp. xxiv *et seq.*

The *ninth* column contains the mean magnitude deduced from the comparisons, assuming

(*a*) That the observer's scale value is correct ; and

(*b*) That the magnitudes of the comparison stars are as adopted in the fifth column of Table XI. p. xxiv.

The *tenth* column gives the mean correction for error in assumption (*a*) ; and

The *eleventh* column gives the mean correction for error in assumption (*b*), as tabulated for each star in the last column of Table XI. See also §§ 98 and 99.

The *twelfth* column contains the excess of the sum of the preceding three columns over the magnitude found at Harvard, this latter being taken by interpolation from the smoothed numbers given on pp. 96–116 of Vol. XXXVII. (Part I.) of the *Harvard Annals*, from which a continuous curve was laid down. After Julian Date 5000 there were no Harvard observations available when these observations were being printed (though Part II. of Vol. XXXVIII. has since appeared), and accordingly this column has been used to give the G.M.T. of the observation, which was not recorded until 1900. See §§ 63 to 65.

T CASSIOPEIÆ.

R. A. $0^h\ 17^m\ 49^s$. Dec. $+55°\ 14'.3$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections. Scale.	Corrections. Stars.	Apparent Correction to Harvard.
1888 Dec. 29	1001	...	9+0·5	...	...	...	...	9·5	+·3	−·2	...
1889 Feb. 23	1057	...	5−0·3	6−1·0	9+1·3	12+1·0	...	8·8	0	0	− ·3
Mar. 16	1078	...	4−0·3	5−0·2	6−0·5	7−0·2	8−0·5	8·4	−·3	0	− ·8
Mar. 31	1093	...	5−0·5	6−0·7	7−0·3	8−0·3	...	8·7	−·3	0	− ·3
Apr. 19	1112	...	3−1·5	6−0·5	7−0·5	8−0·5	...	8·7	−·3	0	− ·2
Apr. 29	1122	...	=5	6−0·5	7−0·2	=8	=11	8·3	−·1	0	− ·3
May 19	1142	...	=1	4−0·6	6−0·6	7+0·5	=8	8·2	−·1	0	− ·4
June 4	1158	...	3−1·0 =8	=4	=5	=6	7+0·5	8·1	0	+·1	− ·2
June 12	1166	...	3−1·0 8+0·3	=4	5+0·5	6−0·5	7+0·3	8·1	+·1	+·1	− ·1
June 18	1172	...	=4	5+0·8	=6	7+0·5	8+0·8	7·7	+·2	0	− ·5
June 30	1184	...	=4	5+1·0	6+0·5	7+1·4	8+1·0	7·3	+·2	0	− ·9
July 21	1205	...	3+0·2	4+1·0	6+0·5	7+1·3	8+1·3	7·0	+·3	+·1	−1·1
Aug. 6	1221	...	4+0·5	5+1·0	6+0·5	7+1·5	8+1·0	7·2	+·3	0	−1·0
Aug. 26	1241	...	4−0·5	=5	=6	7+0·4	8+0·2	8·1	+·1	0	− ·5
Sept. 10	1256	...	4−0·6	5+0·5	6−0·5	7−0·3	8+0·5	8·2	−·1	0	− ·7
Sept. 18	1264	...	4−0·5	=5	6−0·5	=7	8−0·5	8·4	−·2	0	− ·7
Oct. 9	1285	...	4−1·0	5−0·8	6−1·0	7−0·8	8−0·8	9·0	−·3	0	− ·6
Oct. 21	1297	...	5−0·5	6−1·5	9+0·5	16+1·0	21+1·0	9·1	+·1	0	− ·4
Nov. 7	1314	...	9−0·2	12−0·5	13+1·0	14+1·5	...	10·1	0	−·1	0
Nov. 27	1334	...	13+0·5	14+0·5	15+0·3	16+0·2	=17	10·5	+·2	0	+ ·1
Dec. 10	1347	...	6−2·0	9−1·0	13+0·6	14+0·3	17+0·3	10·6	0	−·1	− ·3
Dec. 24	1361	...	9−1·0	13+0·5	14+1·5	17+0·5	18+1·0	10·3	+·1	−·1	− 7
1890 Jan. 10	1378	...	9−1·5	=13	14+0·5	17−1·0	18−0·5	11·3	−·1	−·1	− ·2
Feb. 3	1402	...	9−1·0	13+0·3	17+0·1	18+1·0	20−0·5	10·7	0	−·1	− ·7
Feb. 18	1417	...	9−1·0	13−0·5	14+0·5	=17	=19	11·0	0	−·1	− ·3
Feb. 28	1427	...	9−0·3	13+1·0	19+0·5	=20	21−0·5	10·4	0	0	− ·7
Mar. 9	1436	...	6−2·0	9−1·0	13+1·0	=17	21−0·5	10·4	−·1	−·1	− ·7
Mar. 15	1442	...	7−2·0	=9	13+1·5	17+1·0	=21	9·9	+·1	−·1	−1·0
Apr. 22	1480	...	5−0·7	6−1·2	7−0·5	8−1·0	9+1·0	9·0	−·2	0	− ·9
May 6	1494	...	6−1·0	7−0·8	8−0·5	9+1·2	17+2·0	8·8	−·1	−·1	− ·5
May 23	1511	...	4−0·5	5+0·5	6−0·2	=7	=8	8·1	−·1	+·1	− ·6
June 14	1533	...	=4	5+0·5	6−0·5	7+0·5	=8	8·0	+·1	+·1	− ·2
June 24	1543	...	4−0·5	=5	6−0·5	=7	8−0·5	8·4	−·2	0	− ·3
July 3	1552	...	4−0·8	5+0·2	6−0·5	=7	8−0·5	8·4	−·1	0	− ·0
July 21	1570	...	5−0·6	6−0·8	7−0·3	9+1·5	21+2·0	8·6	−·1	0	− 2
Aug. 12	1592	...	4−1·0	5−0·2	6−0·7	7−0·4	8−0·5	8·7	−·3	0	+ ·2
Aug. 24	1604	...	3−0·5	=4	6+0·7	7+1·0	=8	7·7	+·1	+·1	+ ·2
Sept. 4	1615	...	4+0·5	5+1·0	6+0·3	7+0·8	8+0·3	7·5	+·3	0	+ ·4
Sept. 11	1622	...	4+0·8	5+1·5	6+1·0	7+1·5	8+1·0	6·9	+·3	0	− ·1
Oct. 1	1642	...	3+0·6 8+0·8	4+0·8	5+1·5	6+1·0	7+1·5	7·0	+·3	+·1	+ ·1

T Cassiopeiæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1890 Oct. 9	1650	...	3+1·0	5+1·6	6+1·3	7+1·6	8+1·5	6·6	+·3	0	−·4
Oct. 16	1657	...	3+0·5	4+0·3	5+1·0	6+1·3	8+1·0	7·1	+·3	+·1	+·1
Oct. 27	1668	...	3+0·6	4+1·0	5+1·5	6+1·0	7+1·5	6·8	+·3	+·1	−·4
Nov. 5	1677	...	4−0·2	5+0·8	6+0·5	7+0·7	8+0·7	7·6	+·2	0	0
Nov. 24	1696	...	5−0·5	6−1·0	7−0·6	8−0·8	9+1·3	8·8	−·2	0	+·2
1891 Jan. 3	1736	...	4−2·0	5−1·5	9+0·5	13+1·5	17+1·3	9·6	+·1	0	0
Jan. 14	1747	...	6−1·3	7−1·5	8−1·2	9+0·3	13+1·5	9·5	−·1	0	−·5
Feb. 10	1774	...	9−1·2	13+0·7	17+0·5	18+1·0	21−1·3	10·7	0	−·1	+·2
Feb. 18	1782	...	9−0·6	13+1·0	17+0·7	18+1·3	21−0·3	10·2	0	−·1	−·4
Mar. 4	1796	...	9−1·5	13+0·3	14+1·0	17−0·2	18+1·0	10·7	0	−·1	−·1
Mar. 28	1820	...	13+0·2	14+0·5	17−1·0	=18	...	11·1	0	0	+·3
Apr. 17	1840	...	9−1·2	=13	14+0·3	17−0·5	=18	11·1	0	−·1	+·5
May 6	1859	...	=13	17−0·5	18+0·5	...	...	10·9	0	0	+·7
May 11	1864	...	9−1·0	13+1·0	=17	18+1·0	...	10·4	0	−·1	+·2
June 9	1893	...	6−1·7	7−1·2	8−1·2	9+0·7	17+1·3	9·4	−·1	−·1	−·3
July 1	1915	...	5−0·8	6−1·3	7−0·6	8−1·0	9+1·0	9·0	−·2	0	−·3
July 10	1924	...	4−1·5	5−0·6	6−1·2	7−1·0	9+1·5	9·0	−·2	0	−·1
Aug. 4	1949	...	6−1·0	7−0·5	8−1·0	9+1·3	17+2·0	8·8	−·1	−·1	0
Aug. 23	1968	...	5−0·5	6−1·0	=7	8−0·5	9+1·5	8·6	−·1	0	−·1
Sept. 4	1980	...	5−0·2	6−1·0	7−0·5	9+1·3	17+2·0	8·8	−·1	0	+·1
Sept. 11	1987	...	4−0·5	=5	6−0·6	=7	=8	8·3	−·1	0	−·3
Oct. 2	2008	...	4−0·6	5+0·2	6−1·3	7−0·3	8−0·7	8·6	−·2	0	+·1
Oct. 23	2029	...	4−0·5	=5	6−0·5	7+0·5	=8	8·2	−·1	0	+·1
Nov. 2	2039	...	4−0·3	5+0·6	6+0·5	7+0·3	8−0·3	7·9	+·1	0	+·1
Nov. 24	2061	...	4+0·3	5+1·0	6+1·0	7+0·6	8+0·3	7·5	+·3	0	+·1
Dec. 17	2084	...	3+0·3	5+1·5	6+1·0	8+1·0	...	6·9	+·3	+·1	−·2
Dec. 22	2089	...	=3	4+0·3	5+1·0	6+0·5	7+1·0	7·4	+·2	+·1	+·2
1892 Jan. 24	2122	...	4+0·7	5+1·0	=6	7+1·0	8+0·5	7·5	+·2	0	+·1
Feb. 3	2132	...	=4	5+0·3	6−0·3	7+0·3	=8	8·0	+·1	0	+·2
Feb. 29	2158	...	4−0·5	5+0·3	6−1·5	=7	8−0·5	8·5	−·1	0	−·2
Mar. 8	2166	...	4−1·0	5−0·3	6−1·3	7−0·3	9+1·5	8·7	−·2	0	−·3
Mar. 18	2176	...	4−1·5	5−1·0	6−1·5	7−1·3	9+1·0	9·3	−·2	0	0
Mar. 30	2188	...	6−1·5	7−1·0	9+0·2	17+1·0	18+1·5	9·4	+·1	−·1	0
Apr. 9	2198	...	9−0·2	15+0·8	16+0·5	17+1·0	=21	10·0	+·1	−·1	+·3
Apr. 22	2211	...	6−2·0	9−0·3	13+1·0	=14	17+1·0	10·3	0	−·1	0
June 2	2252	...	9−1·7	13+0·3	15−0·4	17−0·4	18−0·4	11·2	−·1	−·1	−·6
June 14	2264	...	=13	15−1·0	16−1·0	17−0·2	18+0·5	11·1	−·1	−·1	−·7
July 4	2284	...	9−1·0	13+0·2	15−0·6	=17	18+0·5	10·9	0	−·1	−·7
July 21	2301	...	9−1·0	13+0·7	15−0·3	16−0·3	=17	10·8	−·1	−·1	−·5
Aug. 10	2321	...	6−2·0	=9	13+0·7	=16	17+0·7	10·2	0	−·1	−·6
Aug. 21	2332	...	6−1·5	=9	13+1·3	15+1·0	16+0·3	9·9	+·1	0	−·4

T Cassiopeiæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1892 Sept. 3	2345	...	$f-1.5$	$g-1.0$	$h-1.0$	$=k$	$m+0.5$	9.6	−·1	+·1	− ·5
Sept. 14	2356	...	$d-2.0$	$e-1.3$	$f-1.0$	$g-1.0$	$l+0.3$	9.3	−·1	0	− ·8
Oct. 5	2377	...	$e-1.0$	$f-1.0$	$g-0.7$	$l+0.5$	$m+1.0$	9.1	0	0	− ·5
Oct. 17	2389	...	$e-1.5$	$h+0.5$	$k+0.5$	$l+1.0$	$m+1.5$	8.8	+·1	0	− ·5
Oct. 23	2395	...	$e-1.0$	$f-1.0$	$g-0.5$	$l+1.0$	$m+1.3$	8.9	0	0	− ·4
Nov. 6	2409	...	$e-1.3$	$g-0.7$	$=h$	$l+1.0$	$m+1.0$	9.1	0	0	− ·1
Nov. 19	2422	...	$e-1.3$	$f-0.7$	$g-0.5$	$l+1.2$	$n+2.0$	8.9	0	+·1	0
Dec. 4	2437	...	$e-1.0$, $m+1.0$	$f-1.0$	$g-1.5$	$=h$	$k+0.5$	9.2	0	+·1	+ ·5
Dec. 13	2446	...	$e-0.7$	$f-0.5$	$g-0.3$	$l+1.3$	$m+1.3$	8.7	0	0	0
1893 Jan. 2	2466	...	$d-1.2$	$e-1.0$	$f-0.5$	$=g$	$h+1.0$	8.5	−·1	0	− ·1
Jan. 17	2481	...	$d-1.0$, $k+1.3$	$=e$	$=f$	$g+0.5$	$h+1.3$	8.0	+·1	0	− ·1
Feb. 5	2500	...	$d-0.5$	$e+0.2$	$f+0.6$	$g+1.0$	$l+1.5$	7.8	+·1	0	+ ·1
Feb. 14	2509	...	$b-1.0$	$d-0.3$	$e+1.0$	$f+1.3$	$g+1.3$	7.2	0	0	− ·5
Feb. 26	2521	...	$c-1.0$	$d-0.3$	$e+1.3$	$f+1.0$	$g+1.6$	7.2	0	0	− ·3
Mar. 7	2530	...	$b-0.4$	$d-0.4$	$e+1.0$	$f+0.3$	$g+1.2$	7.4	0	0	0
Mar. 12	2535	...	$b-1.0$	$d-0.5$	$e+0.7$	$f+0.7$	$g+1.2$	7.5	0	0	+ ·1
Mar. 21	2544	...	$d-1.0$	$e+0.3$	$f+0.3$	$g+0.7$	$l+1.5$	8.0	+·1	0	+ ·6
Apr. 7	2561	...	$b-1.0$	$d-1.0$	$e+0.7$	$f+0.7$	$g+1.3$	7.6	0	0	− ·4
Apr. 18	2572	...	$e-0.5$	$f-1.0$	$=g$	$l+2.0$	$m+2.0$	8.4	0	0	(− ·1)
May 6	2590	...	$e-1.0$	$f-0.7$	$g-0.5$	$l+1.0$	$n+2.0$	8.8	0	+·1	(− ·6)
May 22	2606	...	$e-1.0$	$f-0.7$	$g-0.7$	$l+1.0$	$m+1.3$	8.9	0	0	(−1·3)
June 7	2622	...	$e-1.4$	$h-0.5$	$k+0.3$	$l+0.3$	$n+1.5$	9.2	0	+·1	(−1·5)
June 14	2629	...	$e-1.5$	$f-1.0$	$g-1.0$	$=k$	$m+1.5$	8.9	−·1	+·1	(−2·0)
July 13	2658	...	$h-2.0$	$k-1.5$	$=l$	$m-0.5$	$n+0.5$	10.5	0	+·1	− ·5
July 30	2675	...	$h-2.5$	$k-2.5$	$l-1.0$	$m-1.0$	$n-0.3$	11.3	−·1	+·1	+ ·2
Aug. 15	2691	...	$h-3.5$	$k-2.5$	$l-2.0$	$m-2.0$	$n-1.0$	12.0	−·1	+·1	+ ·9
Aug. 29	2705	...	$h-3.0$	$k-2.0$	$l-2.0$	$m-1.2$	$n-0.5$	11.5	−·1	+·1	+ ·6
Sept. 11	2718	...	$l-1.0$	$m-1.0$	$p+0.5$	$q+2.0$	$r+2.0$	10.6	0	−·2	− ·4
Sept. 22	2729	...	$g-2.0$	$h-1.5$	$l-0.6$	$m-0.3$	$p+0.8$	10.4	−·1	−·2	− ·5
Oct. 9	2746	...	$h-2.0$	$k-1.0$	$l-1.0$	$=m$	$p+1.0$	10.6	0	−·1	+ ·2
Oct. 22	2759	...	$e-1.7$, $p+1.3$	$h-1.5$	$k-0.6$	$=l$	$m+0.5$	9.9	0	−·1	− ·3
Nov. 6	2774	...	$e-1.3$	$f-1.0$	$g-1.0$	$l+0.3$	$p+1.5$	9.4	0	−·1	− ·5
Nov. 26	2794	...	$e-1.3$	$f-1.0$	$g-1.0$	$l+1.0$	$p+1.5$	9.3	0	−·1	− ·3
Dec. 10	2808	...	$e-1.5$	$f-1.0$	$g-1.0$	$l+1.3$	$p+2.5$	9.0	0	−·1	− ·4
Dec. 30	2828	...	$d-1.5$	$e-1.3$	$=f$	$g-0.3$	$l+1.5$	8.6	−·1	0	− ·6
1894 Jan. 20	2849	...	$e-1.0$	$f-0.3$	$g-0.3$	$l+1.3$	$p+2.5$	8.7	0	−·1	− ·3
Jan. 30	2859	...	$e-1.3$	$f-0.5$	$g-0.3$	$l+1.3$	$p+3.0$	8.7	0	−·1	− ·2
Feb. 10	2870	...	$e-1.0$	$f-0.5$	$g-0.5$	$l+1.3$	$m+1.3$	8.8	0	0	+ ·2
Feb. 24	2884	...	$e-0.7$	$f-0.5$	$g-0.5$	$l+1.3$	$p+1.6$	8.9	0	−·1	+ ·4
Mar. 6	2894	...	$e-0.6$	$f-0.3$	$g+0.2$	$l+1.3$	...	8.5	0	0	+ ·3
Mar. 16	2904	...	$d-1.0$	$e-1.0$	$=f$	$=g$	$l+1.3$	8.4	0	0	+ ·4
Mar. 24	2912	...	$e-1.0$	$=f$	$g+0.5$	$l+1.3$	$m+1.3$	8.5	+·1	0	+ ·8
Apr. 8	2927	...	$d-1.0$	$e+0.3$	$=f$	$g+1.0$	$l+1.3$	8.0	+·1	0	+ ·5
Apr. 28	2947	...	$d+1.0$	$e+1.0$	$f+1.0$	$g+1.0$	$l+2.0$	7.1	+·2	0	− ·1

T Cassiopeiæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1894 May 18	2967	...	$b-2\cdot0$	$d-1\cdot2$	$e+1\cdot0$	$f+0\cdot6$	$g+1\cdot0$	7·8	0	0	+ ·5
May 29	2978	...	$c-0\,5$	$d-1\cdot0$	$e+1\cdot2$	$f+1\cdot2$	$g+1\cdot4$	7·2	0	0	0
June 18	2998	...	$d-1\cdot0$	$e+1\cdot0$	$f+1\cdot3$	$g+1\cdot3$	...	7·3	+·1	0	− ·3
June 27	3007	...	$b-1\cdot4$	$d-1\cdot0$	$e+0\cdot7$	$f+1\cdot3$	$g+1\cdot0$	7·6	0	0	− ·2
July 18	3028	...	$d-1\cdot3$	$e-1\cdot0$	$=f$	$g-0\cdot5$	$l+1\cdot0$	8·7	−·1	0	+ ·2
July 27	3037	...	$d-1\cdot5$	$e-0\cdot7$	$=f$	$g+0\cdot3$	$l+1\cdot2$	8·4	0	0	− 4
Aug. 15	3056	...	$e-1\cdot3$	$f-1\cdot0$	$g-0\cdot7$	$l+0\cdot5$	$m+1\cdot3$	9·1	0	0	− ·3
Aug. 29	3070	...	$e-1\cdot0$	$f-1\cdot0$	$g-0\cdot7$	$=l$	$p+1\cdot0$	9·4	−·1	−·1	− ·6
Sept. 11	3083	...	$e-1\cdot2$	$f-1\cdot2$	$g-1\cdot0$	$=l$	$m+0\cdot3$	9·5	−·1	0	− ·8
Sept. 26	3098	...	$e-2\cdot0$	$g-1\cdot5$	$l-0\cdot5$	$m-0\cdot5$	...	10·2	−·1	0	− ·8
Oct. 21	3123	...	$l-1\cdot3$	$m-1\cdot3$	$p+0\cdot2$	$q+1\cdot6$	$r+1\cdot3$	11·0	0	−·2	− ·2
Nov. 16	3149	80	$l-1\cdot3$	$p-0\cdot3$	$r+0\cdot3$	...	...	11·6	0	−·3	+ ·1
Dec. 4	3167	80	$l-3\cdot0$	$p-1\cdot0$	$r+1\cdot0$	...	...	12·2	0	−·3	+ ·7
Dec. 19	3182	...	$e-2\cdot0$	$g-1\cdot4$	$l-1\cdot2$	$=m$	$=p$	10·4	−·1	−·2	−1·1
Dec. 27	3190	...	$e-1\cdot5$	$g-1\cdot5$	$l-0\cdot7$	$m-0\cdot3$	$p+0\cdot5$	10·2	− 1	−·2	−1·1
1895 Jan. 23	3217	...	$e-1\cdot3$	$g-1\cdot0$	$=k$	$l+0\cdot6$	$m+0\cdot3$	9·5	0	0	− ·7
Feb. 12	3237	...	$d-1\cdot3$	$e-1\cdot3$	$f-0\cdot3$	$g-0\cdot7$	$l+1\cdot5$	8·7	−·1	0	− ·4
Feb. 23	3248	...	$e-0\cdot5$	$f-0\cdot3$	$=g$	$h+1\cdot0$	$l+1\cdot3$	8·4	0	0	− ·2
Mar. 13	3266	...	$d-1\cdot0$	$e-0\cdot4$	$f+0\cdot5$	$g+0\cdot7$	$l+1\cdot5$	8·0	0	0	− ·3
Mar. 22	3275	...	$e-1\cdot0$	$f-0\cdot5$	$g-0\cdot2$	$k+0\cdot7$	$l+1\,3$	8·7	0	0	+ ·4
Apr. 11	3295	...	$d-1\cdot3$	$e-0\cdot3$	$=f$	$g+0\cdot8$	$l+2\cdot3$	8·0	0	0	− ·2
May 1	3315	...	$d-1\cdot5$	$e-0\cdot6$	$=f$	$g+0\cdot3$	$h+1\cdot0$	8·4	0	0	+ ·1
May 9	3323	...	$d-1\cdot3$	$e-0\cdot3$	$f+0\cdot2$	$g+0\cdot5$	$l+1\cdot5$	8·2	0	0	− ·1
May 27	3341	...	$d-1\cdot3$	$e-0\cdot3$	$f-0\cdot3$	$g+0\cdot3$	$h+1\cdot0$	8·3	0	0	+ ·1
June 6	3351	...	$d-1\cdot3$	$e-0\cdot3$	$f+0\cdot4$	$g+0\cdot4$	$l+1\cdot5$	8·2	0	0	0
June 24	3369	...	$d-1\cdot0$	$e+0\cdot6$	$f+0\cdot6$	$g+1\cdot0$	$l+1\cdot5$	7·8	+·1	0	0
July 4	3379	...	$e+1\cdot0$	$l+3\cdot0$	...	...	...	6·9	+·1	0	− ·7
July 28	3403	...	$d-0\cdot5$	$e+1\cdot0$	$f+1\cdot0$	$g+1\cdot0$	$l+2\cdot0$	7·4	+·1	0	− 1
Aug. 13	3419	...	$b-1\cdot0$	$d-1\cdot0$	$e+1\cdot0$	$f+0\cdot7$	$g+1\cdot0$	7·6	0	0	0
Aug. 24	3430	...	$b-1\cdot0$	$c-0\cdot5$	$d-1\cdot0$	$e+1\cdot0$	$f+1\cdot0$	7·5	0	0	− ·2
Sept. 4	3441	...	$=e$	$f+0\cdot3$	$g+0\cdot6$	$l+1\cdot3$	...	8·0	+·2	0	+ ·4
Sept. 18	3455	...	$d-1\cdot0$	$e+0\cdot2$	$f+0\cdot5$	$g+0\cdot5$	$l+1\cdot3$	8·0	+·1	0	+ ·2
Sept. 26	3463	...	$d-1\cdot0$	$e-0\cdot1$	$=f$	$g+1\cdot0$	$l+1\cdot0$	8·1	0	0	+ ·1
Oct. 10	3477	...	$e-0\cdot2$	$=f$	$g+0\cdot2$	$l+1\cdot2$	$m+2\cdot0$	8·3	+·1	0	+ ·2
Oct. 17	3484	...	$d-1\cdot5$	$e-0\cdot7$	$f-0\cdot5$	$=g$	$l+1\cdot3$	8·6	−·1	0	+ ·2
Oct. 27	3494	...	$e-1\cdot0$	$f-0\cdot3$	$g-0\cdot3$	$l+1\cdot0$	$m+1\cdot0$	8·8	0	0	+ ·2
Nov. 13	3511	...	$e-1\cdot5$	$f-1\cdot0$	$g-0\cdot7$	$l+0\cdot6$	$m+1\cdot0$	9·2	0	0	0
Dec. 1	3529	...	$e-1\cdot5$	$g-1\cdot0$	$l-0\cdot7$	$m+0\cdot5$	$p+1\cdot0$	9·8	0	−·2	− ·4
Dec. 31	3559	...	$f-1\cdot6$	$g-1\cdot3$	$l-0\cdot3$	$=m$	$p+0\cdot3$	10·2	0	−·2	−1·3
1896 Jan. 28	3587	...	$h-1\cdot5$	$k-1\cdot5$	$l-1\cdot2$	$m-0\cdot8$	$p-0\cdot3$	10·9	−·1	−·1	−1·1
Feb. 17	3607	...	$k-2\cdot0$	$l-1\cdot3$	$=p$	$r+0\cdot5$	...	11·4	0	−·1	− ·5
Feb. 26	3616	...	$h-2\cdot0$	$k-1\cdot3$	$l-1\cdot0$	$m-0\cdot3$	$p-0\cdot2$	11·0	−1	−·1	−1·0
Mar. 23	3642	...	$h-2\cdot0$	$k-1\cdot3$	$l-1\cdot0$	$=m$	$p+0\cdot6$	10·7	0	−·1	− ·8
Apr. 16	3666	...	$e-2\cdot0$	$f-1\cdot5$	$g-1\cdot0$	$k-0\cdot5$	$=l$	9·8	−·1	0	− ·5
Apr. 26	3676	...	$d-2\cdot0$	$e-1\cdot3$	$h-1\cdot0$	$=k$	$l+0\cdot6$	9·5	−·1	0	− ·5
May 6	3686	...	$d-1\cdot5$	$e-1\cdot0$	$f-0\cdot6$	$g-0\cdot6$	$l+0\cdot5$	8·9	−·1	0	−·7

T CASSIOPEIÆ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1896 May 19	3699	...	$e-1\cdot3$	$f-1\cdot2$	$g-1\cdot0$	$l+0\cdot3$	$m+1\cdot0$	9·3	0	0	+ ·1
May 31	3711	...	$e-1\cdot0$	$f-0\cdot6$	$g-0\cdot3$	$l+0\cdot8$	$m+0\cdot8$	9·0	0	0	− ·1
June 17	3728	...	$b-2\cdot0$	$c-1\cdot3$	$e-0\cdot6$	$f-0\cdot3$	$=g$	8·4	−·2	+·1	− ·
June 24	3735	...	$e-0\cdot6$	$f-0\cdot4$	$g-0\cdot2$	$l+1\cdot2$	$m+1\cdot2$	8·7	0	0	− ·1
July 11	3752	...	$e-0\cdot6$	$f-0\cdot3$	$=g$	$l+1\cdot2$	$m+1\cdot7$	8·5	0	0	− ·2
July 26	3767	...	$d-1\cdot5$	$e-0\cdot6$	$f-0\cdot2$	$g+0\cdot3$	$l+1\cdot3$	8·4	0	0	− ·2
Aug. 4	3776	...	$e-0\cdot2$	$f-0\cdot3$	$g+0\cdot3$	$l+1\cdot3$	$m+1\cdot3$	8·4	0	0	− ·2
Aug. 16	3788	...	$d-1\cdot3$	$e+0\cdot2$	$f-0\cdot2$	$g+0\cdot5$	$h+1\cdot3$	8·1	0	0	− ·4
Sept. 2	3805	...	$e-0\cdot2$	$=f$	$g+0\cdot2$	$l+1\cdot5$	$m+1\cdot5$	8·3	+·1	0	− ·1
Sept. 18	3821	...	$d-1\cdot2$	$e-0\cdot5$	$f+0\cdot3$	$g+0\cdot7$	$l+1\cdot3$	8·2	0	0	− ·2
Oct. 4	3837	..	$d-1\cdot0$	$e+0\cdot5$	$f+0\cdot5$	$g+1\cdot0$	$l+1\cdot5$	7·8	+·1	0	− ·1
Oct. 19	3852	...	$d-0\cdot3$	$e+1\cdot0$	$f+1\cdot0$	$g+1\cdot3$	$l+2\cdot0$	7·3	+·1	0	− ·3
Nov. 3	3867	...	$d-0\cdot6$	$e+0\cdot6$	$f+0\cdot6$	$g+0\cdot8$	$l+2\,0$	7·6	+·1	0	+ ·2
Nov. 12	3876	...	$d-1\cdot0$	$e+0\cdot3$	$f+0\cdot3$	$g+0\cdot7$	$l+1\cdot5$	7·9	+·1	0	+ ·4
Dec. 11	3905	...	$d-1\cdot3$	$e-0\cdot4$	$f-0\cdot3$	$=g$	$l+1\cdot2$	8·5	−·1	0	0
1897 Feb. 7	3963	..	$e-1\cdot0$	$f-1\cdot0$	$g-0\cdot7$	$l+0\cdot3$	...	9·1	−·1	0	− ·6
Mar. 15	3999	...	$e-1\cdot5$	$f-1\cdot2$	$g-1\cdot0$	$=l$	$m-0\cdot2$	9 7	−·2	0	−1·8
Apr. 14	4029	...	$f-1\cdot3$	$g-1\cdot3$	$k-1\cdot2$	$l-0\cdot5$	$m-0\cdot3$	10·1	−·2	0	−1·7
May 5	4050	...	$g-2\cdot0$	$h-1\cdot5$	$k-1\cdot0$	$l-0\cdot7$	$m-0\,7$	10·6	−·1	0	(−1·1)
May 21	4066	...	$e-2\cdot5$	$f-2\cdot5$	$k-2\cdot0$	$l-1\cdot0$	$m-1\cdot0$	10·9	−·1	0	(− ·6)
June 11	4087	...	$g-2\cdot0$	$h-1\cdot7$	$k-1\cdot2$	$l-0\cdot3$	$m-0\cdot3$	10·5	−·1	0	(− ·6)
July 12	4118	...	$d-2\cdot0$	$e-1\cdot4$	$g-1\cdot0$	$l+0\cdot2$	$m+0\cdot2$	9 5	0	−·1	− ·4
Aug. 3	4140	...	$e-1\cdot3$	$g-0\cdot3$	$h+0\cdot6$	$l+1\cdot0$	$m+1\cdot3$	8·8	0	0	− ·3
Sept. 3	4171	...	$d-1\cdot3$	$=e$	$=f$	$g+0\cdot7$	$l+2\cdot0$	8·0	0	0	− ·6
Sept. 14	4182	...	$d-1\cdot5$	$e-1\cdot0$	$f-0\cdot3$	$=g$	$l+2\cdot0$	8·5	−·1	0	− ·2
Oct. 1	4199	...	$e-1\cdot3$	$=f$	$g+0\cdot5$	$l+1\cdot5$	$m+1\cdot5$	8·5	+·1	0	0
Oct. 21	4219	...	$e-0\cdot7$	$f-0\cdot5$	$g-0\cdot5$	$l+1\cdot3$	$m+2\cdot0$	8·6	0	0	0
Nov. 1	4230	...	$d-1\cdot3$	$e-0\cdot5$	$g+0\cdot5$	$k+1\cdot3$	$m+1\cdot3$	8·3	0	0	− ·2
Nov. 18	4247	...	$d-1\cdot0$	$e+1\cdot0$	$f+1\cdot0$	$g+1\cdot4$	$l+2\cdot3$	7·4	+·1	0	− ·7
Dec. 3	4262	...	$d-1\cdot0$	$e+1\cdot0$	$f+1\cdot3$	$g+1\cdot3$	$m+2\cdot5$	7·4	+·1	0	− ·4
Dec. 22	4281	...	$d-1\cdot0$	$e+0\cdot6$	$f+0\cdot3$	$g+1\cdot0$	$l+2\cdot3$	7·7	+·1	0	− ·1
1898 Jan. 7	4297	...	$d-1\cdot3$	$e+0\cdot2$	$f+0\cdot7$	$g+1\cdot0$	$m+1\cdot5$	8·0	+·2	0	+ ·3
Feb. 2	4323	...	$d-1\cdot3$	$e+0\cdot5$	$f+0\cdot8$	$g+1\cdot2$	$l+2\cdot5$	7·6	+·2	0	− ·2
Feb. 20	4341	...	$d-1\cdot3$	$e+0\cdot7$	$f+1\cdot0$	$g+1\cdot0$	$l+2\,0$	7·6	+·2	0	− ·3
Feb. 26	4347	...	$d-1\cdot3$	$=e$	$f+0\,3$	$g+0\cdot0$	$l+1\cdot5$	8·1	+·1	0	0
Mar. 7	4356	...	$d-1\cdot3$	$e+0\cdot5$	$=f$	$g+1\cdot0$	$l+1\cdot3$	8·0	+·1	0	2
Mar. 20	4369	...	$e-0\cdot5$	$f-0\cdot3$	$=g$	$l+1\cdot5$	$m+2\cdot0$	8·4	0	0	− ·1
Mar. 29	4378	...	$e-1\,0$	$f-0\cdot7$	$g-0\cdot3$	$l+1\cdot0$	$m+1\cdot3$	8·8	−·1	0	0
Apr. 8	4388	...	$e-1\cdot2$	$f-1\cdot0$	$g-0\cdot7$	$l+0\cdot7$	$m+1\cdot0$	9·1	−·1	0	0
Apr. 16	4396	...	$d-2\cdot0$	$e-1\cdot2$	$f-0\cdot8$	$g-1\cdot2$	$m+1\cdot0$	9·2	−·2	0	− ·2
Apr. 30	4410	...	$e-1\cdot3$	$f-1\cdot0$	$g-0\cdot7$	$=h$	$m+0\cdot7$	9·2	−·1	0	− ·5
June 10	4451	...	$e-1\cdot3$	$f-1\cdot0$	$g-1\cdot0$	$=l$	$=m$	9·6	−·2	0	−1·5
June 22	4463	...	$e-2\cdot0$	$f-1\,5$	$g-1\cdot3$	$=l$	$=m$	9·9	−·2	0	−1·6
July 7	4478	...	$e-2\cdot0$	$g-1\cdot0$	$k-1\cdot0$	$l-0\,3$	$m-0\cdot2$	10·1	−·2	0	−1·7
July 31	4502	...	$e-2\cdot0$	$g-1\cdot4$	$l-1\cdot0$	$m-0\cdot5$	$p-0\cdot3$	10 5	−·2	−·2	−1·6
Aug. 11	4513	...	$g-1\cdot7$	$h-1\cdot4$	$k-1\cdot0$	$l-1\cdot0$	$=m$	10·4	−·2	0	−1·4

T Cassiopeiæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1898 Aug. 27	4529	...	$f-1\cdot3$	$g-1\cdot0$	$=l$	$m+1\cdot0$	$p+1\cdot0$	9·7	0	−·2	−1·8
Sept. 10	4543	...	$f-2\cdot0$	$g-1\cdot3$	$=l$	$m+1\cdot0$	$p+1\cdot0$	9·9	0	−·2	− ·9
Sept. 18	4551	...	$e-1\cdot4$	$f-1\cdot3$	$g-1\cdot0$	$l+0\cdot3$	$m+0\cdot8$	9·4	−·1	0	− ·7
Oct. 1	4564	...	$e-1\cdot3$	$f-0\cdot7$	$g-0\cdot6$	$l+1\cdot3$	$m+2\cdot0$	8·8	−·1	0	− ·5
Oct. 12	4575	...	$e-1\cdot3$	$f-1\cdot0$	$=g$	$l+1\cdot0$	$m+1\cdot3$	8·9	0	0	+ ·4
Nov. 9	4603	...	$e-0\cdot5$	$f-0\cdot3$	$=g$	$l+1\cdot3$	$m+1\cdot7$	8·5	0	0	+ ·6
Dec. 9	4633	...	$e-1\cdot0$	$f-1\cdot0$	$g-0\cdot5$	$k+1\cdot0$	$l+1\cdot0$	8·9	−·1	0	+ ·7
Dec. 20	4644	...	$d-2\cdot0$	$e-1\cdot0$	$=f$	$g+0\cdot5$	$l+1\cdot3$	8·5	0	0	+ ·2
Dec. 30	4654	...	$d-2\cdot0$	$e-1\cdot3$	$f-1\cdot0$	$=g$	$l+1\cdot3$	8·9	−·1	0	+ ·4
1899 Jan. 22	4677	...	$d-1\cdot5$	$e-1\cdot0$	$f-0\cdot5$	$=g$	$l+1\cdot0$	8·7	−·1	0	+ ·2
Jan. 28	4683	...	$d-2\cdot3$	$e-1\cdot3$	$f-1\cdot0$	$=g$	$l+2\cdot0$	8·8	−·1	0	+ ·3
Feb. 16	4702	...	$e-1\cdot0$	$f-1\cdot0$	$g+0\cdot3$	$k+1\cdot0$	$l+2\cdot0$	8·4	+·1	0	+ ·3
Feb. 21	4707	...	$d-1\cdot5$	$=e$	$f+1\cdot0$	$g+1\cdot0$	$m+1\cdot5$	8·0	+·1	0	0
Feb. 25	4711	...	$e-0\cdot3$	$f+1\cdot0$	$g+1\cdot0$	$l+2\cdot0$	$m+2\cdot0$	7·8	+·2	0	0
Mar. 9	4723	...	$d-1\cdot5$	$e-0\cdot5$	$f+1\cdot0$	$g+1\cdot3$	$l+2\cdot0$	7 8	+·1	0	+ ·2
Mar. 17	4731	...	$d-2\cdot0$	$e+0\cdot7$	$f+1\cdot0$	$g+1\cdot2$	$l+2\cdot0$	7·7	+·2	0	+ ·2
Mar. 24	4738	...	$b-1\cdot5$	$e+0\cdot7$	$f+1\cdot0$	$g+1\cdot5$	$l+2\cdot0$	7·5	+·2	0	0
Apr. 8	4753	...	$d-1\cdot5$	$e+0\cdot5$	$f+0\cdot8$	$g+0\cdot8$	$m+2\cdot0$	7·9	+·2	0	+ ·4
Apr. 17	4762	...	$e+0\cdot7$	$f+1\cdot3$	$g+1\cdot3$	$l+2\cdot0$	...	7·3	+·2	0	− ·3
Apr. 26	4771	...	$d-2\cdot0$	$e-0\cdot4$	$f+0\cdot2$	$g+1\cdot0$	$m+1\cdot5$	8·3	+·1	0	+ ·4
May 3	4778	...	$e+0\cdot5$	$f+1\cdot0$	$g+1\cdot0$	$l+2\cdot3$	$m+3\cdot0$	7·3	+·3	0	− ·6
May 22	4797	...	$e-1\cdot0$	$f-0\cdot5$	$=g$	$h+1\cdot0$	$l+1\cdot3$	8·5	0	0	0
June 3	4809	...	$e-1\cdot3$	$f-0\cdot6$	$g-1\cdot0$	$l+1\cdot0$	$m+1\cdot5$	9·0	−·1	0	+ ·2
June 10	4816	...	$f-1\cdot3$	$g-1\cdot0$	$=k$	$l+1\cdot0$	$m+1\cdot0$	9·3	0	0	+ ·4
July 4	4840	...	$e-2\cdot0$	$h-1\cdot0$	$=k$	$l+1\cdot0$	$m+1\cdot3$	9·4	0	0	− ·1
July 27	4863	...	$g-1\cdot5$	$h-1\cdot2$	$=k$	$l-0\cdot3$	$m+0\cdot3$	9·9	−·1	0	− ·3
Aug. 11	4878	...	$h-2\cdot0$	$k-1\cdot0$	$l-0\cdot5$	$m+0\cdot3$	$p+1\cdot2$	10·4	0	−·1	− ·3
Aug. 19	4886	...	$f-2\cdot3$	$g-1\cdot5$	$k-1\cdot0$	$l-1\cdot0$	$=m$	10·4	−·2	0	− ·5
Aug. 26	4893	...	$g-2\cdot7$	$h-2\cdot0$	$k-1\cdot0$	$l-1\cdot0$	$m-0\cdot3$	10·8	− 2	0	− ·2
Sept. 7	4905	...	$h-1\cdot5$	$k-0\cdot7$	$l-1\cdot0$	$m-0\cdot5$	$p+0\cdot6$	10·6	−·1	−·1	− ·7
Sept. 16	4914	...	$h-2\cdot3$	$k-1\cdot5$	$l-1\cdot0$	$m-0\cdot2$	$p+0\cdot3$	10·9	−·1	−·1	− ·5
Sept. 27	4925	...	$h-2\cdot5$	$k-1\cdot7$	$l-1\cdot3$	$m-1\cdot3$	$p-0\cdot3$	11·4	−·2	−·1	− ·2
Oct. 2	4930	...	$h-3\cdot0$	$k-2\cdot0$	$l-1\cdot3$	$m-1\cdot0$	$p+0\cdot5$	11·4	−·1	−·1	− ·1
Oct. 9	4937	...	$h-3\cdot0$	$k-2\cdot0$	$l-1\cdot0$	$m-0\cdot7$	$p+0\cdot5$	11·2	−·1	−·1	− ·3
Oct. 24	4952	...	$h-3\cdot0$	$k-2\cdot0$	$l-1\cdot5$	$m-0\cdot5$	$p+0\cdot7$	11·3	−·1	−·1	− ·2
Nov. 10	4969	...	$h-2\cdot0$	$k-1\cdot0$	$l-1\cdot0$	$m+0\cdot3$	$p+0\cdot7$	10·6	0	−·1	− ·7
Nov. 19	4978	...	$h-1\cdot7$	$k-1\cdot0$	$l-0\cdot5$	$=m$	$p+1\cdot0$	10·4	−·1	−·1	− ·9
Dec. 9	4998	...	$h-1\cdot0$	$k+0\cdot3$	$l+1\cdot0$	$m+1\cdot0$	$p+2\cdot0$	9·3	+·2	−·1	−1·1
Dec. 27	5016	...	$e-1\cdot5$	$f-1\cdot5$	$g-1\cdot0$	$l+1\cdot0$	$m+1\cdot7$	9·2	−·1	0	...
1900 Jan. 5	5025	...	$d-1\cdot5$	$e-1\cdot5$	$f-0\cdot5$	$=g$	$m+1\cdot5$	8·8	−·1	0	G.M.T. ...
Jan. 18	5038	...	$e-1\cdot2$	$f-1\cdot0$	$g-0\cdot7$	$l+2\cdot0$	$m+2\cdot0$	8·7	−·1	0	...
Jan. 27	5047	...	$e-1\cdot5$	$f-0\cdot5$	$g-0\cdot5$	$k+1\cdot0$	$l+1\cdot5$	8·7	−·1	0	...
Feb. 11	5062	...	$d-2\cdot0$	$e-1\cdot3$	$f-1\cdot0$	$g-0\cdot3$	$l+1\cdot3$	9·0	−·2	0	...
Mar. 12	5091	...	$e-1\cdot0$	$f-0\cdot6$	$g-0\cdot3$	$l+2\cdot0$	$m+2\cdot0$	8·5	−·1	0	h m 8 0
Mar. 28	5107	...	$d-2\cdot0$	$e-1\cdot0$	$=f$	$+1\cdot0$	$l+1\cdot5$	8·4	0	0	8 50

T CASSIOPEIÆ—*continued*.

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		G.M.T.
									Scale.	Stars.	
											h m
1900 Apr. 9	5119	...	$d-2\cdot0$	$e-1\cdot0$	$=f$	$g+0\cdot5$	$h+0\cdot5$	8·6	0	0	8 20
Apr. 18	5128	...	$e-1\cdot0$	$f-0\cdot3$	$=g$	$l+1\cdot5$	$m+1\cdot5$	8·6	0	0	9 10
May 3	5143	...	$e-0\cdot5$	$f+1\cdot0$	$g+1\cdot0$	$h+1\cdot0$	$k+2\cdot0$	7·7	+·2	+·1	9 10
May 28	5168	...	$d-1\cdot5$	$e+1\cdot5$	$f+1\cdot7$	$g+2\cdot0$	$h+2\cdot0$	7·1	+·2	0	9 30
June 5	5176	...	$d-1\cdot5$	$e+1\cdot0$	$f+1\cdot0$	$g+1\cdot3$	$h+2\cdot0$	7·4	+·2	0	9 40
June 21	5192	...	$d-1\cdot3$	$e+1\cdot0$	$f+0\cdot8$	$g+1\cdot0$	$k+1\cdot6$	7·6	+·2	0	9 40
July 3	5204	...	$d-1\cdot5$	$e+1\cdot3$	$f+1\cdot3$	$g+1\cdot6$	$l+2\cdot3$	7·3	+·2	0	10 20
July 10	5211	...	$d-1\cdot5$	$e+1\cdot0$	$f+1\cdot0$	$g+1\cdot5$	$k+2\cdot0$	7·4	+·2	0	10 40
July 17	5218	...	$d-1\cdot5$	$e+0\cdot7$	$=f$	$g+1\cdot0$	$l+1\cdot5$	8·0	+·1	0	10 0
July 23	5224	...	$d-1\cdot5$	$=e$	$f+1\cdot0$	$g+1\cdot5$	$l+2\cdot0$	7·7	+·1	0	10 40
Aug. 9	5241	...	$e-1\cdot0$	$f-0\cdot6$	$g-0\cdot3$	$h+1\cdot0$	$l+1\cdot7$	8·5	−·1	0	9 40
Aug. 16	5248	...	$e-1\cdot0$	$f-0\cdot5$	$=g$	$l+1\cdot5$	$m+2\cdot0$	8·5	0	0	9 30
Aug. 30	5262	...	$e-1\cdot5$	$g-1\cdot0$	$=h$	$l+1\cdot3$	$m+1\cdot6$	9·0	0	0	9 40
Sept. 8	5271	...	$e-1\cdot3$	$f-1\cdot0$	$g-0\cdot5$	$h+0\cdot2$	$l+1\cdot0$	9·0	−·1	0	9 40
Sept. 15	5278	...	$e-1\cdot5$	$f-1\cdot0$	$g-0\cdot7$	$l+0\cdot6$	$m+1\cdot0$	9·2	−·1	0	9 10
Sept. 25	5288	...	$e-1\cdot5$	$g-1\cdot0$	$=k$	$l+0\cdot3$	$m+1\cdot0$	9·4	0	0	9 40
Oct. 5	5298	...	$e-1\cdot7$	$h-1\cdot3$	$k-0\cdot5$	$l+0\cdot3$	$m+1\cdot0$	9·7	−·1	0	7 50
Oct. 19	5312	...	$e-2\cdot0$	$h-1\cdot5$	$k-0\cdot7$	$l-1\cdot0$	$=m$	10·3	−·2	0	7 10
Nov. 2	5326	...	$h-1\cdot8$	$k-1\cdot0$	$l-0\cdot3$	$m+0\cdot2$	$p+1\cdot0$	10·3	0	−·1	6 40
Nov. 19	5343	...	$f-1\cdot5$	$g-2\cdot0$	$k-1\cdot0$	$l-1\cdot0$	$=m$	10·3	−·2	0	6 50
Nov. 30	5354	...	$e-2\cdot8$	$h-1\cdot5$	$k-2\cdot0$	$l-1\cdot0$	$m-0\cdot5$	10·8	−·2	0	7 0
Dec. 15	5369	...	$h-2\cdot5$	$k-2\cdot0$	$l-1\cdot0$	$m-1\cdot2$	$=p$	11·3	−·2	−·1	6 20

S CASSIOPEIÆ.

R. A. $1^h\ 12^m\ 18^s$. Dec. $+72°\ 5'{\cdot}1$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections. Scale.	Corrections. Stars.	Apparent Correction to Harvard.
1888 Feb. 7	0675	25	10−1·0	12−1·5	13−1·5	α+0·5	...	11·4	−·1	+·1	...
Feb. 16	0684	...	10−0·8	12−0·7	13−1·0	...	...	11 1	−·2	+·1	...
Mar. 1	0698	...	4−2·0	12+2·0	13+2·0	17+2·0	...	9·0	+·2	−·1	...
Mar. 21	0718	...	3−2·0	4−0·3	=6	7+1·0	8+2·0	8·8	0	0	...
Apr. 8	0736	...	2−1·5	=4	6+1·0	...	...	8·4	0	+·1	...
May 1	0759	...	1−2·0, 8+2·5	2−2·0	3−1·5	4−0·5	6+1·0	8·6	−·1	+·1	...
May 11	0769	...	4−0·5, 13+2·0	6−0·3	8+2·0	10+2·5	12+2·0	8·4	+·2	0	...
May 31	0789	...	4−1·0, 13+1·3	6−0·7	8+0·5	10+1·0	12+1·5	9·3	+·1	0	...
June 26	0815	...	4−1·3	=8	10+1·0	12+1·8	13+1·5	9·3	+·1	0	...
July 11	0830	...	4−1·5	10+0·5	12+1·2	13+1·0	=17	9·9	+·1	−·1	...
July 25	0844	...	8−1·0	10+0·5	=12	13−0·5	17−0·5	10·6	−·1	−·1	...
Aug. 13	0863	...	9−0·7	=12	13−0·3	=15	16+0·5	10·7	0	+·2	...
Aug. 29	0879	...	9−0·7	12−0·8	13−1·0	15−0·7	16−0·5	11·3	−·2	+·2	...
Sept. 10	0891	...	12−1·3	13−1·3	15−0·5	16−0·5	α+0·3	11·4	−·1	+·2	...
Oct. 1	0912	...	12−1·5	13−2·0	15−0·5	16−0·5	α−0·5	11·7	−·2	+·2	...
Oct. 14	0925	88	12−1·0	13−1·5	15−0·8	16−0·5	α+0·5	11·4	−·1	+·2	...
Oct. 31	0942	...	12−2·0	13−2·0	α−1·0	...	...	12·2	−·2	+·1	...
1889 Jan. 20	1023	...	=19	α−1·3	...	...	...	12·5	−·1	0	...
Feb. 9	1043	...	=19	...	...	...	...	12·5	0	0	...
Feb. 23	1057	...	=19	...	...	...	...	12·5	0	0	...
Mar. 20	1082	...	=19	α−1·0	...	...	...	12·3	−·1	0	...
May 19	1142	...	=18	19+0·6	=24	α−1·0	...	11·8	0	0	−·3
June 4	1158	...	10−1·3	12−0·7	13−1·0	α+0·7	...	11·1	−·1	+·1	+·1
June 12	1166	...	10−1·5, 17−1·0	12−1·0	13−1·0	15+0·3	16+0·3	11·2	−·1	0	+1·1
June 30	1184	...	=10	12+0·5	=13	16−1·0	=17	10·6	0	0	+·8
July 17	1201	...	=10	12+0·6	13+0·2	16+1·0	17−0·3	10·2	+·1	0	+·3
July 29	1213	...	=8	=10	12+1·2	13+0·7	17+1·0	9·7	+·2	−·1	−·1
Aug. 9	1224	...	=8	10+0·2	12+1·3	13+1·0	17+0·7	9·7	+·2	−·1	−·1
Aug. 26	1241	...	10+1·0	12+1·0	13+1·0	17+1·0	...	9·4	+·3	−·1	−·3
Sept. 10	1256	...	4−2·0	8+0·5	12+1·0	13+1·2	17+0·6	9·7	+·2	−·1	0
Sept. 18	1264	...	4−1·0	6−1·0	8+0·3	12+1·3	13+1·3	9·5	+·1	0	0
Oct. 9	1285	...	1−2·0	2−1·7	=4	6+0·6	8+1·0	8·7	0	0	−·1
Oct. 21	1297	...	1−1·0	2−1·0	4+0·5	=6	8+1·5	8·3	0	0	−·1
Nov. 6	1313	...	1−1·6	2−1·3	3−1·0	4+1·0	6+1·5	8·1	−·1	+·1	−·1
Nov. 27	1334	...	1−1·0	2−0·7	3−0·7	4+1·0	6+1·5	7·8	−·1	+·1	−·6
Dec. 10	1347	...	2−1·0	3−0·7	4+0·5	6+1·0	8+2·0	8·0	+·1	+·1	−·4

α has been written for "Pair No. 11."
1889 Mar. 31, April 19, 29. Slightly brigter than 19.
1888 Nov. 27, Dec. 28. Just visible power 132.

S Cassiopeiæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1889 Dec. 24	1361	...	2−1·5 13+2·0	3−1·5	=4	8+1·5	12+2·0	8·5	+·1	+·1	−·1
1890 Jan. 1	1369	...	1−1·5	3−1·0	4−0·5	=6	8+1·0	8·8	−·1	0	−·2
Jan. 19	1387	...	4−0·2	6+0·3	8+1·0	12+1·5	13+1·5	8·9	+·2	0	·2
Feb. 3	1402	...	4−1·0	8+0·6	12+1·2	13+1·0	17+0·6	9·5	+·2	−·1	0
Feb. 18	1417	...	4−1·0	6−1·0	8+0·5	10+1·0	17+0·5	9·7	+·1	−·2	−·3
Feb. 27	1426	...	=8	10+0·8	12+0·5	13+0·5	17+0·3	9·9	+·2	−·1	−·1
Mar. 9	1436	...	8−0·5	10+0·5	12+0·8	13+1·0	=17	9·9	+·1	−·1	−·4
Mar. 20	1447	...	4−2·0	10−0·5	12+0·2	13+0·4	=17	10·5	0	−·1	−·2
Mar. 28	1455	...	10−0·7 17−1·2	12−1·0	13−1·0	15+0·6	16+0·3	11·1	−·1	0	+·3
Apr. 25	1483	...	10−1·0	12−0·7	13−1·0	=15	16−0·2	11·2	−·2	+·2	−·2
May 6	1494	...	12−1·5	13−1·2	...	...	...	11·7	−·2	+·2	0
May 23	1511	...	...	12−2·0	13−2·0	a−0·5	...	12·0	−·2	+·2	−·1
July 3	1552	...	18−1·0	=19	24−1·0	...	...	12·5	−·1	0	−·6
July 15	1564	...	...	18−1·0	24−1·0	27−0·5	a−1·0	12·3	−·2	0	−1·2
Aug. 12	1592	...	19−1·0	27−1·5	...	...	...	13·3	−·2	0	−·7
Aug. 23	1603	...	19−0·2	27−0·6	30+0·5	...	...	12·5	−·1	0	−1·5
Sept. 4	1615	...	16−1·0	=19	27−0·5	...	...	12·1	−·1	0	−2·1
Sept. 11	1622	...	19−0·5	27−0·3	=28	...	...	12·8	−·1	0	−1·5
Oct. 1	1642	...	19−0·5	...	...	...	...	13·0	−·2	0	−1·6
Oct. 11	1652	...	19−0·3	27−0·8	...	...	...	12·6	−·2	0	−2·0
Nov. 5	1677	...	19−0·5	=30	...	...	...	13·1	−·1	0	−1·4
1891 Feb. 10	1774	...	19+0·3	27−1·0	...	...	...	12·4	0	0	−·4
Feb. 25	1789	...	10−2·0	13−2·5	19+0·7	=27	...	12·2	−·1	0	−·6
Mar. 11	1803	...	15−1·5	16−2·0	27−0·2	...	...	12·3	−·2	+1	−·4
Mar. 28	1820	...	10−2·0	13−2·7	=18	=24	27−0·2	12·0	−1	0	−·5
Apr. 17	1840	...	10−2·0	13−2·8	15−0·5	16−1·0	=27	12·1	−·2	+1	−·2
May 11	1864	...	10−2·2	12−1·3	13−2·0	15+0·3	16−0·3	11·7	−·1	+2	+·6
June 5	1889	...	4−1·0	6−0·6	8+1·3	12+1·3	13+1·3	9·2	+·1	0	−·1
July 1	1915	...	2−1·3	4+0·5	6+1·2	8+1·7	12+2·5	8·1	+·2	+·1	+·2
July 10	1924	...	1−1·5	2−1·0	4+1·0	6+1·6	8+2·2	7·8	+·1	0	−·2
July 28	1942	...	2−1·3	4+0·7	6+1·3	8+1·7	10+2·0	8·1	+·2	0	+·4
Aug. 4	1949	...	1−1·5	4+0·7	6+1·5	8+2·0	10+2·0	8·1	+·2	−·1	+·3
Aug. 23	1968	...	2−1·5	=4	6+0·7	8+1·5	10+2·0	8·5	+·1	0	+·3
Sept. 4	1980	...	2−1·5	4−0·3	6+0·3	8+1·0	10+1·5	8·8	+·1	0	+·3
Sept. 22	1998	...	4−0·8	6−0·4	8+1·0	10+1·2	13+2·0	9·1	+1	0	+·2
Oct. 10	2016	...	4−1·3	6−0·7	10+1·0	12+1·3	13+1·3	9·4	+·1	0	+·2
Oct. 28	2034	...	4−1·3	6−0·8	8+0·3	10+0·7	17+0·6	9·8	+·1	−·2	+·1
Nov. 11	2048	...	8−0·5	=10	12+0·7	13+0·5	17−0·3	10·2	0	−·1	+·2
Nov. 27	2064	...	6−2·0	8−1·3	10+0·8	=12	13+0·6	10·4	0	0	+·2
Dec. 11	2078	...	8−1·5	10−0·5	12−0·5	13−1·0	17−1·5	11·3	−·2	−·1	+·4
Dec. 22	2089	...	10−0·6	12−0·6	13−1·0	16+0·4	27+1·2	10·9	0	+·1	+·2
1892 Jan. 24	2122	...	4−2·5	12−1·5	13−0·5	16−1·0	=27	11·4	−·2	+·1	−·3
Feb. 16	2145	...	10−2·6	15−2·0	19+0·7	=27	...	12·3	0	0	0

1890 Nov. 21. Not seen in bright moonlight.
1891 Jan. 3. Not visible 34, 80, 132. Jan. 10, just visible 132.

S CASSIOPEIÆ—*continued.*

Date.	Julian Day.	Power	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1892 Feb. 29	2158	...	19+0·2	27−0·5	...	...	...	12·2	0	0	− ·5
Mar. 18	2176	...	19+0·2	=30	...	...	...	12·7	+·1	0	− 3
Mar. 30	2188	...	19+0·5	27−0·5	...	...	...	12·0	0	0	−1·4
Apr. 14	2203	...	11−2·0	13−3·0	=19	27−1·0	...	12·8	−·2	0	−1·1
Apr. 29	2218	...	11−2·0	=30	...	...	...	13·1	−·1	0	−1·1
May 20	2239	...	=19	...	...	...	...	12·5	0	0	−1·8
June 2	2252	...	=19	...	...	...	...	12·5	0	0	−1·9
July 4	2284	...	=19	...	...	...	...	12·5	0	0	−2·0
July 21	2301	...	19−0·5	27−1·5	...	...	...	13·0	−·2	0	−1·8
Aug. 10	2321	...	=19	...	...	...	...	12·5	0	0	−2·1
Aug. 24	2335	...	19−0·5	...	...	...	...	13·0	−·2	0	−1·7
Sept. 12	2354	...	19−0·5	...	...	...	...	13·0	−·2	0	−1·7
Sept. 26	2368	...	12−2·5	13−3·0	16 2·0	=19	27−0·6	12·6	−·2	+1	−1·7
Oct. 10	2382	...	19−0·5	27−1·0	...	...	...	12·8	−·2	0	−1·4
Nov. 10	2413	...	10−2·0	12−1·5	13−1·5	15−0·3	16−1·0	11·9	−·2	+·2	+ ·1
Nov. 26	2429	...	10−0·7	12−1·5	13−1·5	=15	16−0·5	11·4	−·2	+·2	+ ·4
Dec. 7	2440	...	10−1·0	=12	13−0·6	=15	16+0·3	10·9	0	+·2	+ ·4
Dec. 28	2461	...	4−2·5	=10	12−0·5	13−0·5	17−1·0	11·0	−·2	−·1	+ ·1
1893 Jan. 11	2475	...	k−0·5	l−0·5	m−0·5	n+0·5	o+0·5	10·5	0	−·1	− ·1
Jan. 24	2488	...	b−1·5	c−2·0	k+0·6	l+0·6	m+1·5	9·1	0	+·1	− ·8
Feb. 5	2500	...	b−1·3	c−1·5	g−0·5	k+1·5	l+1·5	8·7	0	+·1	− ·9
Feb. 14	2509	...	b−1·3	c−1·3	g+0·3	k+1·3	l+1·3	8·5	0	+·1	− ·8
Mar. 4	2527	...	b−1·3	c−1·3	e−0·5	$=f$	$=g$	8·5	−·1	+·1	− ·4
Mar. 11	2534	...	b−1·5	c−1·0	g+0·5	k+1·2	l+1·2	8·5	0	+·1	+ ·1
Mar. 21	2544	...	b−1·5	c−1·0	$=g$	k+1·2	l+1·2	8·6	0	+·1	+ ·3
Apr. 7	2561	...	b−1·6	c−1·3	g+0·6	k+1·5	l+1·5	8·5	0	+·1	+ ·2
Apr. 18	2572	...	b−1·5	c−1·0	g+0·5	k+1·5	l+1·5	8·4	0	+·1	(0)
May 6	2590	...	b−2·0	c−1·5	$=g$	k+1·5	l+1·5	8·7	0	+·1	(+ ·2)
May 22	2606	...	b−1·5	c−2·0	g−0·2	k+1·2	l+1·2	8·9	0	+·1	(+ ·2)
June 7	2622	...	$\{c-2·0$ $o+1·5\}$	g−0·5	k+1·0	l+1·0	$n+1·5\}$	9·3	+·1	0	(+ ·5)
June 29	2644	...	$\{g-1·0$ $o+2·3\}$	k+0·8	l+1·0	m+1·0	$n+2·3\}$	9·1	+·1	−·1	(− ·1)
July 13	2658	...	g−1·3	k+1·0	l+1·0	m+1·0	n+2·0	9·3	+·1	−·1	(− ·1)
July 30	2675	...	$=k$	l+0·5	m+1·0	n+1·3	o+1·3	9·6	+·2	−·1	(0)
Aug. 15	2691	...	k−1·0	l+0·2	m−0·6	n+1·0	o+1·0	10·4	0	−·1	(+ ·2)
Aug. 29	2705	...	k−1·0	$=l$	m−0·5	n+0·5	o+0·5	10·5	0	−·1	− ·3
Sept. 11	2718	...	k−1·2	l−0·7	m−1·2	n+0·2	o+0·2	10·9	0	−·1	− ·7
Sept. 22	2729	...	m−0·7	n−0·3	o−0·3	p+1·3	r+1·3	10·9	0	−·1	−1·2
Oct. 9	2746	...	k−2·0	l−1·5	n−0·5	o−1·0	p+0·5	11·6	−·1	0	−1·0
Oct. 22	2759	...	k−2·5	l−2·0	m−2·0	n−1·3	o−1·3	12·2	−·1	−·1	− ·6

S CASSIOPEIÆ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale	Stars.	
1893 Nov. 6	2774	...	$k-2\cdot0$	$l-2\cdot0$	$n-1\cdot0$	$o-1\cdot0$	$u+1\cdot0$	12·2	−·1	0	− ·6
Nov. 26	2794	80	$k-3\cdot0$	$n-1\cdot5$	$o-2\cdot0$	$p-1\cdot0$	$=u$	12·8	−·1	0	− ·1
Dec. 11	2809	80	$p-1\cdot0$	$u-0\cdot5$	...	...	...	13·1	−·1	+·2	0
1894 Jan. 2	2831	132	$p-2\cdot0$	$r-1\cdot0$	$=u$	...	...	13·3	−·1	+·1	− ·3
Feb. 10	2870	132	$=u$	...	...	...	...	13·2	0	0	− ·9
Feb. 24	2884	132	$p-1\cdot3$	$r-1\cdot3$	$u+0\cdot5$	...	...	13·0	0	+·1	−1·0
April 1	2920	80	$m-3\cdot0$	$n-1\cdot5$	$o-1\cdot5$	$=v$	$=r$	12·4	−·1	−·1	−1·4
May 4	2953	80	$p-1\cdot0$	$r-1\cdot0$	$u+0\cdot5$	....	...	12·8	0	+·1	0
June 28	3008	80	$k-2\cdot0$	$l-1\cdot5$	$m-1\cdot5$	$p+1\cdot0$	$r+1\cdot0$	11·4	0	+·1	− ·2
July 18	3028	...	$k-1\cdot0$	$l-1\cdot0$	$m-1\cdot3$	$n-0\cdot5$	$o-0\cdot3$	11·2	−·1	−·1	− ·2
Aug. 15	3056	...	$k+0\cdot3$	$l+0\cdot6$	$m-0\cdot6$	$n+0\cdot6$	$o+0\cdot6$	10·1	+·1	−·1	− ·5
Aug. 29	3070	...	$=k$	$l+0\cdot5$	$m+0\cdot5$	$n+0\cdot5$	$o+0\cdot5$	10·0	+·1	−·1	− ·4
Sept. 11	3083	...	$c-2\cdot0$	$g-1\cdot2$	$k+0\cdot3$	$l+0\cdot6$	$m+0\cdot2$	9·7	0	0	− ·3
Sept. 27	3099	...	$g-1\cdot3$	$k+0\cdot5$	$l+1\cdot0$	$m+0\cdot5$	$n+1\cdot0$	9·7	+·1	−·1	0
Oct. 12	3114	...	$b-1\cdot3$	$c-1\cdot6$	$k+1\cdot0$	$l+1\cdot3$	$m+1\cdot3$	8·8	0	+·1	− ·5
Oct. 29	3131	...	$b-1\cdot0$	$c-1\cdot3$	$g+0\cdot3$	$k+1\cdot7$	$l+1\cdot7$	8·3	0	+·1	− ·3
Nov. 15	3148	...	$b-1\cdot0$	$c-0\cdot5$	$g+1\cdot2$	$k+1\cdot7$	$m+1\cdot7$	8·1	0	0	+ ·2
Dec. 15	3178	...	$b-1\cdot0$	$c-1\cdot0$	$g+1\cdot0$	$k+2\cdot0$	$l+2\cdot0$	8·0	0	+·1	+ ·4
1895 Jan. 3	3197	...	$b-0\cdot5$	$c-0\cdot7$	$g+1\cdot3$	$k+2\cdot0$	$l+2\cdot0$	7·8	0	+·1	0
Jan. 28	3212	...	$b-1\cdot5$	$c-1\cdot0$	$k+1\cdot5$	$l+1\cdot5$	$m+2\cdot0$	8·4	0	+·1	+ ·2
Feb. 12	3237	...	$b-2\cdot0$	$c-1\cdot0$	$k+1\cdot5$	$l+1\cdot5$	$m+2\cdot0$	8·5	0	+·1	0
Feb. 23	3248	...	$b-1\cdot5$	$c-1\cdot5$	$=g$	$k+1\cdot3$	$l+1\cdot3$	8·7	0	+·1	− ·1
Mar. 13	3266	...	$b-2\cdot0$	$c-1\cdot3$	$g-0\cdot5$	$k+1\cdot3$	$l+1\cdot3$	8·8	0	+·1	− ·2
Mar. 22	3275	...	$b-2\cdot0$	$g-0\cdot3$	$k+1\cdot0$	$l+1\cdot0$	$m+1\cdot0$	9·1	0	0	− ·2
April 13	3297	...	$b-2\cdot0$	$c-1\cdot7$	$k+0\cdot8$	$l+0\cdot8$	$m+0\cdot8$	9·2	0	+·1	− ·4
May 1	3315	...	$c-2\cdot0$	$g-1\cdot0$	$k+0\cdot5$	$l+0\cdot5$	$m+1\cdot0$	9·5	0	0	− ·6
May 9	3323	...	$c-2\cdot0$	$g-1\cdot3$	$k+0\cdot3$	$l+0\cdot3$	$m+0\cdot3$	9·7	0	0	− ·6
May 27	3341	...	$g-1\cdot5$	$k-1\cdot0$	$l-1\cdot0$	$=m$	$o+1\cdot0$	10·6	0	−·1	− ·1
June 6	3351	...	$g-1\cdot4$	$k-0\cdot7$	$l-0\cdot5$	$m-0\cdot5$	$p+1\cdot0$	10·6	−·1	0	− ·4
July 4	3379	80	$k-2\cdot0$	$l-2\cdot0$	$m-1\cdot0$	...	...	11·8	−·1	−·1	0
Aug 3	3409	80	$k-2\cdot0$	$l-1\cdot5$	$m-2\cdot0$	$n-1\cdot2$	$o-1\cdot2$	12·0	−·1	−·1	− ·6
Aug. 24	3430	80	$k-2\cdot0$	$l-2\cdot0$	$m-2\cdot0$	...	...	12·1	−·1	−·1	−1·0
Sept. 7	3444	132	$k-3\cdot0$	$l-2\cdot0$	$m-2\cdot0$	$p-1\cdot0$	...	12·5	−·1	0	− ·7
Sept. 20	3457	80	$k-3\cdot0$	$l-3\cdot0$	$m-3\cdot0$	$p-0\cdot5$	$=r$	12·7	−·1	0	− ·7
Oct. 10	3477	132	$k-3\cdot5$	$l-2\cdot5$	$p-1\cdot0$	$r-1\cdot0$	...	12·9	−·1	+·1	− ·9
Oct. 19	3486	132	$k-3\cdot0$	$l-2\cdot3$	$m-2\cdot3$	$p-1\cdot0$	$r-1\cdot0$	12·7	−·1	0	−1·4
1896 Feb. 17	3607	132	$k-3\cdot0$	$p-1\cdot0$	$r-1\cdot0$	...	...	12·8	−·1	+·1	−1·6
Apr. 28	3678	...	$k-1\cdot0$	$l-1\cdot5$	$m-1\cdot5$	$n-1\cdot0$	$o-0\cdot3$	11·5	−·1	−·1	−1·6
May 6	3686	80	$k-1\cdot3$	$l-1\cdot0$	$m-1\cdot3$	$n-1\cdot0$	$o-0\cdot5$	11·4	−·1	−·1	−1·6
May 19	3699	80	$k-1\cdot3$	$l-1\cdot6$	$m-2\cdot0$	$n-1\cdot0$	$o-1\cdot0$	11·8	−·1	−·1	−1·0
May 31	3711	...	$k-1\cdot5$	$l-1\cdot2$	$m-1\cdot2$	$n+0\cdot8$	$o+0\cdot8$	10·9	0	−·1	−1·5
June 17	3728	...	$c-3\cdot5$	$g-2\cdot0$	$k-1\cdot5$	$l-1\cdot0$	$m-1\cdot5$	11·2	−·1	0	− ·7
June 24	3735	...	$k-1\cdot4$	$l-1\cdot0$	$m-1\cdot0$	$n-0\cdot5$	$=o$	11·2	−·1	−·1	− ·7

1894 Jan. 26. Not seen 34, 80, 132; clear, dark sky. Mar. 8, 22, just seen 132. April 22, just seen 132.
1895 Oct. 29, Nov. 14, Dec. 7; 1896 Jan. 8, 19, not seen 34, 80; *just* visible 132. Also 1896 Mar. 1, 23, April 16; 1897 Sept. 14, Nov. 1, Dec. 6, 22; and 1899 Feb. 28, Mar. 14, Sept. 27, Oct. 25.

S CASSIOPEIÆ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1896 July 11	3752	...	$g-2\cdot0$	$k-0\cdot7$	$l-0\cdot5$	$m-0\cdot7$	$=o$	10·9	−·1	−·1	− ·3
July 26	3767	...	$c-2\cdot3$	$g-1\cdot2$	$k+0\cdot6$	$l+0\cdot6$	$m+0\cdot2$	9·7	0	0	− ·5
Aug. 4	3776	...	$b-2\cdot3$	$c-2\cdot3$	$g-0\cdot3$	$k+1\cdot0$	$m+0\cdot5$	9·4	0	0	− ·3
Aug. 16	3788	...	$b-1\cdot8$	$c-1\cdot5$	$k+1\cdot0$	$l+1\cdot3$	$m+1\cdot3$	8·8	0	+·1	− ·3
Sept. 7	3810	...	$b-1\cdot3$	$c-1\cdot0$	$g+0\cdot5$	$l+1\cdot3$	$m+1\cdot3$	8·5	0	0	− ·3
Sept. 18	3821	...	$b-1\cdot3$	$c-1\cdot3$	$k+1\cdot3$	$l+1\cdot3$	$m+1\cdot5$	8·6	0	+·1	0
Sept. 28	3831	...	$b-1\cdot2$	$c-1\cdot2$	$g+0\cdot7$	$k+1\cdot3$	$l+1\cdot3$	8·4	0	+·1	− ·2
Oct. 19	3852	...	$b-1\cdot3$	$c-1\cdot0$	$k+1\cdot3$	$l+1\cdot3$	$m+1\cdot3$	8·6	0	0	0
Nov. 2	3866	...	$b-1\cdot3$	$c-1\cdot0$	$g+0\cdot3$	$k+1\cdot3$	$l+1\cdot3$	8·5	0	+·1	− ·2
Nov. 10	3874	...	$c-1\cdot3$	$g-0\cdot2$	$k+1\cdot0$	$l+1\cdot0$	$m+1\cdot5$	8·9	0	0	+ ·1
Dec. 11	3905	...	$c-2\cdot5$	$g-1\cdot0$	$k+1\cdot0$	$l+1\cdot0$	$m+1\cdot0$	9·4	0	0	+ ·2
1897 Feb. 14	3970	...	$k-0\cdot3$	$l-0\cdot6$	$m-0\cdot2$	$n+0\cdot5$	$o+0\cdot5$	10·4	0	−·1	− ·2
Mar. 15	3999	...	$k-1\cdot0$	$l-1\cdot0$	$m-1\cdot0$	$n-0\cdot3$	$o-0\cdot3$	11·1	−·1	−·1	− ·4
Apr. 14	4029	...	$k-1\cdot3$	$l-1\cdot3$	$m-1\cdot3$	$n-1\cdot0$	$=o$	11·5	−·1	−·1	−1·0
May 7	4052	80	$k-2\cdot5$	$l-2\cdot5$	$m-2\cdot0$	$o-1\cdot0$	$u+1\cdot0$	12·3	−·1	0	− ·7
July 23	4129	80	$k-2\cdot0$	$l-2\cdot0$	$m-2\cdot5$	$n-1\cdot5$	$o-1\cdot5$	12·3	−·1	−·1	(−2·2)
Aug. 6	4143	80	$k-3\cdot0$	$l-3\cdot0$	$m-2\cdot0$	$n-1\cdot0$	$o-2\cdot0$	12·6	−·1	−·1	(−2·1)
Sept. 3	4171	132	$k-3\cdot0$	$l-2\cdot0$	$m-2\cdot0$	$n-1\cdot0$	$=u$	12·4	−·1	0	(−2·2)
Oct. 3	4201	132	$k-3\cdot0$	$l-3\cdot0$	$m-3\cdot0$	...	...	13·1	−·1	−·1	(−1·5)
Oct. 21	4219	132	$k-3\cdot0$	$l-3\cdot0$	$m-3\cdot0$	$n-1\cdot5$	$o-1\cdot5$	12·8	−·1	−·1	(−1·6)
Nov. 18	4247	132	$k-3\cdot0$	$l-3\cdot0$	$m-3\cdot0$	$p-1\cdot0$	$r-1\cdot0$	13·0	−·1	0	(− ·8)
1898 Feb. 8	4329	...	$k-2\cdot0$	$l-2\cdot0$	$m-1\cdot5$	$n-1\cdot5$	$o-1\cdot0$	12·0	−·2	−·1	− ·2
Feb. 23	4344	...	$g-3\cdot0$	$k-1\cdot3$	$l-1\cdot3$	$m-1\cdot0$	$=o$	11·4	−·2	−·1	− ·4
Mar. 7	4356	...	$g-2\cdot5$	$k-1\cdot3$	$l-1\cdot3$	$m-1\cdot0$	$n-0\cdot2$	11·3	−·2	−·1	+ ·1
Mar. 20	4369	...	$c-2\cdot5$	$g-1\cdot3$	$k+0\cdot8$	$l+0\cdot8$	$m+1\cdot3$	9·5	+·1	0	− ·4
Apr. 8	4388	...	$b-2\cdot5$	$c-1\cdot3$	$g+0\cdot3$	$k+1\cdot3$	$l+1\cdot3$	8·8	+·1	+·1	+ ·1
Apr. 16	4396	...	$b-1\cdot5$	$c-1\cdot5$	$g+0\cdot7$	$k+2\cdot0$	$l+1\cdot3$	8·4	+·1	+·1	− ·1
Apr. 30	4410	...	$b-1\cdot7$	$c-1\cdot0$	$g+1\cdot0$	$k+2\cdot0$	$l+2\cdot0$	8·1	+·1	+·1	0
May 28	4438	...	$b-1\cdot5$	$c-1\cdot0$	$g+1\cdot0$	$k+2\cdot0$	$l+2\cdot0$	8·1	+·1	+·1	(+ ·5)
June 10	4451	...	$b-1\cdot0$	$c-1\cdot0$	$g+1\cdot0$	$k+2\cdot0$	$l+2\cdot0$	8·0	+·1	+·1	(+ ·5)
June 22	4463	...	$b-1\cdot3$	$c-1\cdot0$	$g+1\cdot3$	$k+1\cdot5$	$l+2\cdot0$	8·1	+·1	+·1	(+ ·6)
July 2	4473	...	$b-0\cdot7$	$c-1\cdot3$	$g+1\cdot5$	$k+1\cdot8$	$l+2\cdot0$	7·9	+·1	+·1	(+ ·4)
July 14	4485	...	$b-2\cdot0$	$c-1\cdot5$	$g+1\cdot3$	$k+1\cdot7$	$l+2\cdot0$	8·3	+·1	+·1	(+ ·7)
July 27	4498	...	$b-1\cdot5$	$c-1\cdot0$	$g+1\cdot0$	$k+1\cdot6$	$l+2\cdot0$	8·2	+·1	+·1	(+ ·4)
Aug. 4	4506	...	$b-1\cdot3$	$c-1\cdot3$	$g+1\cdot0$	$k+1\cdot5$	$l+2\cdot0$	8·2	+·1	+·1	(+ ·3)
Aug. 16	4518	...	$b-2\cdot5$	$c-2\cdot0$	$g-0\cdot5$	$k+1\cdot5$	$l+2\cdot0$	8·9	−·1	+·1	(+ ·4)
Sept. 10	4543	...	$c-2\cdot3$	$g-1\cdot3$	$k+1\cdot0$	$l+1\cdot5$	$m+1\cdot2$	9·3	+·1	0	(+ ·3)
Sept. 23	4556	...	$c-1\cdot5$	$g-0\cdot7$	$k+1\cdot0$	$m+1\cdot0$	$o+2\cdot0$	9·1	+·1	−·1	− ·4
Oct. 3	4566	...	$g-1\cdot3$	$k+1\cdot3$	$l+1\cdot3$	$m+1\cdot0$	$n+1\cdot8$	9·2	+·2	−·1	− ·4
Oct. 19	4582	...	$g-1\cdot3$	$k+0\cdot7$	$l+0\cdot7$	$m+0\cdot7$	$n+1\cdot0$	9·6	+·2	−·1	− ·4
Nov. 3	4597	...	$k-0\cdot7$	$=l$	$m+0\cdot2$	$n+1\cdot0$	$=o$	10·3	0	−·1	− ·3
Nov. 21	4615	...	$k-1\cdot0$	$l-0\cdot2$	$n-0\cdot2$	$o-0\cdot8$	...	11·1	−·2	−·1	...
Dec. 9	4633	...	$k-2\cdot0$	$l-1\cdot0$	$m-2\cdot0$	$=n$	$o-1\cdot0$	11·6	−·2	−·1	...
Dec. 19	4643	...	$k-1\cdot3$	$l-0\cdot5$	$m-1\cdot0$	$=n$	$o-0\cdot3$	11·0	−·2	−·1	...
Dec. 29	4653	80	$k-2\cdot3$	$l-2\cdot3$	$m-1\cdot0$	$n-1\cdot3$	$o-1\cdot0$	12·0	−·2	−·1	...
1899 Jan. 28	4683	80	$k-3\cdot0$	$l-3\cdot0$	$m-2\cdot0$	$p-1\cdot0$	$=r$	12·6	−·2	0	...

S CASSIOPEIÆ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1899 Apr. 8	4753	132	$k-3\cdot0$	$l-3\cdot0$	$m-3\cdot0$	$n-2\cdot0$	$o-1\cdot0$	12·8	−·2	−·1	...
June 3	4809	132	$k-3\cdot0$	$l-3\cdot0$	$m-2\cdot5$	$n-2\cdot0$	$o-1\cdot0$	12·7	−·2	−·1	...
July 27	4863	132	$k-2\cdot0$	$l-2\cdot5$	$m-3\cdot0$	$n-1\cdot0$	$o-1\cdot5$	12·4	−·2	−·1	...
Aug. 9	4876	80	$k-3\cdot0$	$l-2\cdot5$	$m-3\cdot0$	$n-1\cdot0$	$o-1\cdot5$	12·6	−·2	−·1	...
Aug. 19	4886	132	$k-2\cdot5$	$l-2\cdot0$	$m-2\cdot0$	$n-1\cdot5$	$o-1\cdot5$	12·3	−·2	−·1	...
Aug. 26	4893	132	$k-3\cdot0$	$l-3\cdot0$	$m-2\cdot0$	$n-1\cdot0$	$o-2\cdot0$	12·6	−·2	−·1	...
Sept. 7	4905	80	$k-3\cdot0$	$l-3\cdot0$	$m-2\cdot0$	$n-1\cdot5$	$=u$	12·7	−·2	0	...
Oct. 5	4933	132	$k-2\cdot7$	$l-2\cdot7$	$m-2\cdot0$	$n-1\cdot0$	$o-1\cdot5$	12·4	−·2	−·1	...
Nov. 19	4978	80	$k-2\cdot0$	$l-1\cdot5$	$m-1\cdot0$	$n-1\cdot0$	$o-1\cdot0$	11·7	−·2	−·1	−·3
Dec. 4	4993	...	$k-1\cdot0$	$=l$	$=m$	$n+1\cdot0$	$=o$	10·4	0	−·1	−·7
Dec. 27	5016	...	$b-2\cdot0$	$=g$	$k+1\cdot5$	$l+1\cdot3$	$m+1\cdot7$	8·7	+·1	0	...
1900 Jan. 10	5030	...	$b-2\cdot0$	$c-1\cdot5$	$g-0\cdot5$	$k+1\cdot5$	$l+0\cdot7$	9·0	−·1	+·1	...
Jan. 18	5038	...	$b-2\cdot0$	$c-2\cdot0$	$=g$	$k+1\cdot7$	$l+2\cdot0$	8·7	0	+·1	..
Feb. 6	5057	...	$b-2\cdot0$	$c-2\cdot0$	$g-1\cdot0$	$k+1\cdot5$	$m+1\cdot2$	9·0	−·1	0	...
Feb. 20	5071	...	$b-2\cdot5$	$c-2\cdot0$	$g-0\cdot3$	$k+1\cdot5$	$l+2\cdot0$	8·9	−·1	+·1	G.M.T. h m
Mar. 12	5091	..	$g-0\cdot3$	$k+1\cdot5$	$l+1\cdot5$	$m+1\cdot8$	$n+2\cdot0$	8·7	+·2	−·1	8 10
Mar. 28	5107	...	$c-1\cdot7$	$g-0\cdot7$	$k+1\cdot7$	$l+1\cdot7$	$m+1\cdot5$	8·8	+·1	0	9 0
Apr. 9	5119	...	$b-3\cdot0$	$g-1\cdot0$	$k+2\cdot0$	$l+1\cdot5$	$m+1\cdot5$	9·0	+·1	0	8 30
Apr. 18	5128	...	$g-1\cdot0$	$k+1\cdot7$	$l+1\cdot5$	$m+2\cdot0$	$n+2\cdot0$	8·8	+·2	−·1	9 20
May 3	5143	...	$c-2\cdot5$	$g-1\cdot2$	$k+1\cdot5$	$l+1\cdot5$	$m+1\cdot7$	8·9	+·1	0	9 20
May 28	5168	...	$c-2\cdot3$	$g-1\cdot2$	$k+1\cdot0$	$l+1\cdot5$	$m+1\cdot0$	9·3	+·1	0	9 40
June 5	5176	...	$c-3\cdot0$	$g-1\cdot0$	$k+0\cdot8$	$l+1\cdot0$	$m+1\cdot0$	9·5	+·1	0	9 50
June 21	5192	...	$g-1\cdot5$	$k+0\cdot3$	$l+0\cdot8$	$m+0\cdot5$	$n+1\cdot0$	9·8	+·2	−·1	9 50
July 3	5204	...	$g-1\cdot3$	$k-0\cdot6$	$l+0\cdot3$	$=m$	$n+0\cdot5$	10·2	0	−·1	10 30
July 14	5215	...	$g-1\cdot5$	$k-1\cdot0$	$l-0\cdot2$	$m-0\cdot3$	$=n$	10·6	−·2	−·1	10 10
July 25	5226	...	$g-1\cdot7$	$k-1\cdot0$	$l-0\cdot5$	$m-1\cdot0$	$=n$	10·8	−·2	−·1	9 30
Aug. 9	5241	...	$k-1\cdot2$	$l-1\cdot0$	$m-1\cdot0$	$=n$	$=o$	11·0	−·1	−·1	10 0
Aug. 18	5250	...	$k-1\cdot3$	$l-1\cdot0$	$m-1\cdot2$	$n-0\cdot5$	$o-0\cdot5$	11·3	−·2	−·1	9 20
Sept. 4	5267	...	$k-1\cdot5$	$l-1\cdot0$	$m-1\cdot0$	$n-0\cdot5$	$o-0\cdot7$	11·3	−·2	−·1	10 10
Sept. 14	5277	...	$k-1\cdot5$	$l-1\cdot2$	$m-1\cdot0$	$n-1\cdot0$	$o-1\cdot0$	11·5	−·2	−·1	9 10
Sept. 30	5293	80	$k-2\cdot5$	$l-1\cdot7$	$m-1\cdot7$	$n-1\cdot0$	$o-1\cdot5$	12·0	−·2	−·1	9 40
Oct. 14	5307	80	$k-2\cdot0$	$l-1\cdot3$	$m-1\cdot3$	$n-1\cdot0$	$o-1\cdot5$	11·8	−·2	−·1	7 40

1899. Not seen 34, 80, 132, Feb. 21, April 26, May 4. Also 1900 Dec. 13.

S Persei.

R. A. $2^h\ 15^m\ 41^s$. Dec. $+58°\ 7'{\cdot}8$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1891 July 19	1933	...	$a-1{\cdot}3$	$=c$	$f+1{\cdot}5$	$g+2{\cdot}0$	...	8·1	+·1	+·1	−·2
Aug. 13	1958	...	$a-1{\cdot}0$	$b-0{\cdot}5$	$c+0{\cdot}5$	$f+1{\cdot}5$	$g+2{\cdot}0$	8·1	0	+·1	−·3
Aug. 29	1974	...	$a-1{\cdot}3$	$=b$	$c+0{\cdot}3$	$f+1{\cdot}0$	...	8·4	−·1	0	−·1
Sept. 5	1981	...	$a-1{\cdot}0$	$b-0{\cdot}7$	$c+0{\cdot}3$	$f+0{\cdot}8$	$g+1{\cdot}3$	8·5	0	+·1	+·2
Sept. 22	1998	...	$a-1{\cdot}3$	$b-0{\cdot}5$	$c-0{\cdot}3$	$f+1{\cdot}5$	$g+2{\cdot}0$	8·3	0	+·1	0
Oct. 10	2016	...	$a-1{\cdot}3$	$b-0{\cdot}7$	$c-0{\cdot}7$	$f+0{\cdot}7$	...	8·9	−·1	0	+·4
Oct. 28	2034	...	$a-1{\cdot}3$	$b+0{\cdot}5$	$c+0{\cdot}3$	$f+1{\cdot}3$	...	8·2	+·1	0	0
Nov. 11	2048	...	$a-1{\cdot}3$	$b-0{\cdot}5$	$c+0{\cdot}5$	$f+1{\cdot}3$	$g+2{\cdot}0$	8·2	0	+·1	0
Nov. 23	2060	...	$a-2{\cdot}0$	$b-0{\cdot}5$	$c+0{\cdot}3$	$f+1{\cdot}5$	$g+2{\cdot}0$	8·3	0	+·1	+·1
Dec. 7	2074	...	$a-1{\cdot}3$	$b-0{\cdot}2$	$c+0{\cdot}5$	$f+1{\cdot}5$	$g+2{\cdot}0$	8·1	0	+·1	0
Dec. 22	2089	...	$a-1{\cdot}0$	$b-0{\cdot}5$	$c+0{\cdot}7$	$f+1{\cdot}5$	...	8·2	0	0	0
1892 Feb. 1	2130	...	$a-1{\cdot}0$	$b+0{\cdot}7$	$=c$	$g+2{\cdot}0$	...	8·1	+·1	+·1	+·1
Feb. 16	2145	...	$a-0{\cdot}5$	$b+1{\cdot}0$	$c+0{\cdot}5$	$f+2{\cdot}0$	$g+2{\cdot}5$	7·5	+·1	+·1	−·4
Feb. 29	2158	...	$a-1{\cdot}0$	$=b$	$c+0{\cdot}2$	$f+1{\cdot}3$	$g+2{\cdot}0$	8·1	+·1	+·1	+·2
Mar. 10	2168	...	$a-0{\cdot}3$	$b+0{\cdot}7$	$c+0{\cdot}7$	$f+1{\cdot}0$	$g+2{\cdot}0$	7·8	+·1	+·1	−·1
Mar. 18	2176	...	$a-1{\cdot}0$	$b+0{\cdot}6$	$c+0{\cdot}3$	$f+1{\cdot}3$	$g+1{\cdot}8$	8·0	+·1	+·1	+·1
Mar. 28	2185	...	$a-0{\cdot}7$	$c+0{\cdot}5$	...	...	...	8·2	0	−·1	0
Apr. 5	2194	...	$a-0{\cdot}5$	$b+0{\cdot}3$	$c+0{\cdot}3$	$f+1{\cdot}0$	$g+1{\cdot}7$	8·0	+·1	+·1	+·1
Apr. 22	2211	...	$a-0{\cdot}7$	$b-0{\cdot}3$	$c+0{\cdot}5$	$f+1{\cdot}2$	$g+1{\cdot}7$	8·1	0	+·1	0
May 20	2239	...	$a-1{\cdot}3$	$b-0{\cdot}3$	$c-0{\cdot}3$	$f+1{\cdot}3$	$g+1{\cdot}7$	8·4	0	+·1	+·1
June 2	2252	...	$a-1{\cdot}5$	$b-1{\cdot}0$	$c-0{\cdot}7$	$f+1{\cdot}0$	$g+1{\cdot}5$	8·7	0	+·1	+·3
June 11	2261	...	$a-1{\cdot}5$	$b-0{\cdot}3$	$c-0{\cdot}3$	$f+1{\cdot}0$	$g+1{\cdot}5$	8·5	0	+·1	+·1
June 29	2279	...	$a-1{\cdot}7$	$b-1{\cdot}0$	$c-0{\cdot}7$	$f+1{\cdot}0$	$g+1{\cdot}5$	8·8	0	+·1	+·2
July 7	2287	...	$a-1{\cdot}5$	$b-1{\cdot}0$	$c-0{\cdot}2$	$f+1{\cdot}0$	$g+1{\cdot}5$	8·6	0	+·1	−·1
July 23	2303	...	$a-1{\cdot}5$	$b-1{\cdot}0$	$c-0{\cdot}7$	$f+1{\cdot}0$	$g+1{\cdot}5$	8·7	0	+·1	−·1
Aug. 5	2316	...	$a-2{\cdot}0$	$b-1{\cdot}5$	$c-0{\cdot}8$	$f+0{\cdot}5$	$g+1{\cdot}3$	9·1	0	+·1	+·1
Aug. 20	2331	...	$a-2{\cdot}0$	$b-1{\cdot}5$	$c-1{\cdot}0$	$f-0{\cdot}2$	$g+0{\cdot}7$	9·4	−·1	+·1	+·2
Sept. 2	2344	...	$a-2{\cdot}5$	$c-1{\cdot}5$	$f+0{\cdot}3$	...	...	9·6	−·1	0	+·2
Sept. 13	2355	...	$a-2{\cdot}0$	$b-1{\cdot}0$	$c-1{\cdot}0$	$=f$	$g-0{\cdot}5$	9·5	−·2	+·1	0
Oct. 5	2377	...	$a-2{\cdot}0$	$b-1{\cdot}5$	$c-1{\cdot}5$	$=f$	$g+1{\cdot}0$	9·4	−·1	+·1	−·1
Oct. 17	2389	...	$a-2{\cdot}3$	$b-1{\cdot}5$	$c-1{\cdot}3$	$f-0{\cdot}6$	$g+0{\cdot}4$	9·7	−·1	+·1	+·2
Oct. 23	2395	...	$a-2{\cdot}0$	$b-1{\cdot}5$	$c-1{\cdot}3$	$f-0{\cdot}5$	$g+0{\cdot}7$	9·5	−·1	+·1	0
Nov. 1	2404	...	$a-1{\cdot}8$	$b-1{\cdot}5$	$c-1{\cdot}3$	$f-0{\cdot}3$	$g+0{\cdot}5$	9·5	−·1	+·1	0
Nov. 16	2419	...	$b-1{\cdot}8$	$c-1{\cdot}5$	$f-0{\cdot}5$	$g+0{\cdot}3$	$l+2{\cdot}0$	9·6	0	+·1	+·2
Dec. 4	2437	...	$a-2{\cdot}0$	$b-2{\cdot}0$	$c-1{\cdot}3$	$f-0{\cdot}5$	$g+0{\cdot}5$	9·7	−·1	+·1	+·2
Dec. 13	2446	...	$b-1{\cdot}5$	$c-1{\cdot}5$	$f-0{\cdot}6$	$g+0{\cdot}3$	$m+2{\cdot}0$	9·7	0	+·1	+·3
1893 Jan. 2	2466	...	$a-2{\cdot}0$	$b-1{\cdot}5$	$f-0{\cdot}5$	$g+0{\cdot}5$	$l+2{\cdot}0$	9·5	0	+·1	+·1
Jan. 17	2481	...	$c-2{\cdot}0$	$f-1{\cdot}5$	$g-0{\cdot}5$	$l+1{\cdot}5$	$m+1{\cdot}5$	10·2	0	+·1	+·8
Feb. 4	2499	...	$b-2{\cdot}0$	$c-2{\cdot}0$	$f-1{\cdot}2$	$g+0{\cdot}2$	$l+2{\cdot}0$	9·9	0	+·1	+·5
Feb. 8	2503	...	$b-2{\cdot}3$	$c-2{\cdot}3$	$f-1{\cdot}0$	$g+0{\cdot}3$	$l+2{\cdot}0$	10·0	0	+·1	+·6
Feb. 26	2521	...	$b-2{\cdot}0$	$c-1{\cdot}5$	$f-0{\cdot}7$	$g+0{\cdot}5$	...	9·7	−·1	+·1	+·2
Mar. 7	2530	...	$b-1{\cdot}5$	$c-1{\cdot}8$	$f-1{\cdot}0$	$g-0{\cdot}3$	$l+2{\cdot}0$	9·8	−·1	+·1	+·3

S Persei—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1893 Mar. 12	2535	...	$b-1\cdot3$	$c-1\cdot3$	$f-1\cdot0$	$g+0\cdot3$	$l+1\cdot5$	9·7	0	+·1	+·3
Mar. 21	2544	...	$b-1\cdot3$	$c-1\cdot3$	$f-0\cdot5$	$=g$	$l+1\cdot5$	9·6	−·1	+·1	+·1
Mar. 30	2553	...	$b-1\cdot3$	$c-1\cdot5$	$f-1\cdot0$	$=g$	$l+1\cdot5$	9·8	−·1	+·1	+·3
Apr. 7	2561	...	$b-1\cdot7$	$c-1\cdot5$	$f-0\cdot7$	$=g$	$l+2\cdot0$	9·7	−·1	+·1	+·2
Apr. 21	2575	...	$b-2\cdot5$	$c-2\cdot5$	$f-1\cdot0$	$=g$	$l+1\cdot5$	10·2	0	+·1	+·8
May 6	2590	...	$c-2\cdot0$	$f-1\cdot2$	$=g$	$l+1\cdot5$	...	10·0	−·1	+·1	+·5
May 22	2606	...	$a-2\cdot0$	$b-1\cdot6$	$c-1\cdot3$	$f-1\cdot0$	$=g$	9·8	−·2	+·1	+·2
June 8	2623	...	$b-1\cdot5$	$c-2\cdot0$	$f-1\cdot0$	$g-0\cdot5$	$l+1\cdot5$	10·0	−·1	+·1	+·6
June 29	2644	...	$b-2\cdot0$	$c-2\cdot0$	$f-0\cdot7$	$g+0\cdot5$	$l+2\cdot3$	9·7	0	+·1	+·4
July 13	2658	...	$b-2\cdot0$	$c-2\cdot5$	$f-1\cdot3$	$g+0\cdot3$	$l+1\cdot5$	10·1	0	+·1	+·8
July 31	2676	...	$b-2\cdot0$	$c-1\cdot3$	$f-0\cdot6$	$g+0\cdot3$	$l+2\cdot0$	9·6	0	+·1	+·3
Aug. 15	2691	...	$b-1\cdot3$	$c-2\cdot0$	$f-0\cdot8$	$g+0\cdot5$	$l+2\cdot5$	9·5	0	+·1	+·3
Aug. 30	2706	...	$a-1\cdot7$	$b-1\cdot5$	$c-1\cdot2$	$f-0\cdot3$	$g+1\cdot2$	9·3	−·1	+·1	0
Sept. 11	2718	...	$a-1\cdot3$	$b-1\cdot3$	$c-0\cdot7$	$=f$	$g+1\cdot0$	9·1	−·1	+·1	−·1
Sept. 22	2729	...	$a-1\cdot3$	$b-1\cdot2$	$c-1\cdot2$	$f-0\cdot5$	$g+1\cdot0$	9·2	−·1	+·1	0
Oct. 9	2746	...	$a-1\cdot2$	$b-1\cdot0$	$c-1\cdot0$	$f-0\cdot3$	$g+1\cdot0$	9·1	−·1	+·1	0
Oct. 23	2760	...	$a-1\cdot0$	$b-1\cdot0$	$c-0\cdot6$	$f+0\cdot5$	$g+1\cdot3$	8·8	0	+·1	−·1
Nov. 6	2774	...	$a-1\cdot3$	$b-1\cdot0$	$c-1\cdot0$	$f+0\cdot6$	$g+1\cdot0$	8·9	0	+·1	+·1
Dec. 2	2800	...	$a-1\cdot5$	$b-1\cdot0$	$c-1\cdot0$	$f+1\cdot0$	$g+1\cdot6$	8·8	0	+·1	+·1
Dec. 14	2812	...	$a-1\cdot2$	$b-1\cdot0$	$c-1\cdot0$	$f+0\cdot6$	$g+1\cdot2$	8·9	0	+·1	+·3
1894 Jan. 12	2841	...	$a-1\cdot5$	$c-1\cdot2$	$f-0\cdot2$	$g+0\cdot7$	...	9·3	−·1	+·1	+·7
Jan. 28	2857	...	$b-1\cdot0$	$c-0\cdot7$	$f-0\cdot5$	$g+1\cdot2$	...	9·1	−·1	+·1	+·5
Feb. 10	2870	...	$a-1\cdot3$	$b-0\cdot5$	$c-0\cdot7$	$=f$	$g+1\cdot3$	8·8	−·1	+·1	+·2
Feb. 24	2884	...	$b-0\cdot3$	$c-0\cdot7$	$f+1\cdot0$	$g+1\cdot5$	...	8·4	0	+·1	−·1
Mar. 8	2896	...	$a-1\cdot0$	$b-0\cdot5$	$c-0\cdot2$	$f+1\cdot0$	$g+1\cdot4$	8·5	0	+·1	0
Mar. 21	2909	...	$a-1\cdot3$	$b-0\cdot5$	$c-0\cdot7$	$f+0\cdot7$	$g+1\cdot3$	8·7	0	+·1	+·2
Apr. 1	2920	...	$a-1\cdot0$	$b-0\cdot5$	$c-0\cdot5$	$f+0\cdot7$	$g+1\cdot5$	8·6	0	+·1	+·2
Apr. 24	2943	...	$a-1\cdot2$	$b-0\cdot3$	$c-0\cdot5$	$f+0\cdot7$	$g+1\cdot2$	8·6	0	+·1	+·2
May 4	2953	...	$a-1\cdot3$	$b-0\cdot3$	$c-0\cdot7$	$f+0\cdot5$	$g+1\cdot0$	8·8	0	+·1	+·4
May 24	2973	...	$a-1\cdot0$	$b-0\cdot7$	$c-0\cdot5$	$f+1\cdot0$	$g+1\cdot3$	8·6	0	+·1	+·2
June 18	2998	...	$a-1\cdot5$	$b-1\cdot3$	$c-0\cdot5$	$f+1\cdot3$	$g+1\cdot6$	8·7	0	+·1	+·3
June 28	3008	...	$a-1\cdot2$	$b-0\cdot3$	$c-0\cdot5$	$f+1\cdot0$	$g+2\cdot0$	8·4	0	+·1	0
July 18	3028	...	$b-1\cdot0$	$c-0\cdot3$	$f+1\cdot0$	$g+1\cdot5$	$l+2\cdot5$	8·6	0	+·1	+·2
Aug. 15	3056	...	$b-1\cdot0$	$c-0\cdot6$	$f+0\cdot7$	$g+1\cdot3$	...	8·7	0	+·1	+·2
Aug. 29	3070	...	$a-1\cdot2$	$b-0\cdot3$	$c-0\cdot7$	$f+0\cdot3$	$g+0\cdot8$	8·8	0	+·1	+·2
Sept. 11	3083	...	$a-1\cdot0$	$b-1\cdot0$	$c-0\cdot6$	$f+0\cdot3$	$g+1\cdot0$	8·9	0	+·1	+·3
Sept. 27	3099	...	$a-1\cdot2$	$b-0\cdot5$	$c-0\cdot5$	$f+\cdot05$	$g+1\cdot0$	8·7	0	+·1	0
Oct. 14	3116	...	$b-1\cdot2$	$c-0\cdot7$	$f+0\cdot3$	$g+1\cdot0$	$l+2\cdot0$	9·0	0	+·1	+·3
Oct. 29	3131	...	$b-1\cdot0$	$c-0\cdot7$	$f+0\cdot3$	$g+1\cdot2$	$l+2\cdot3$	8·9	0	+·1	+·1
Nov. 15	3148	...	$a-1\cdot5$	$b-1\cdot0$	$c-1\cdot0$	$f+0\cdot2$	$g+1\cdot0$	9·1	0	+·1	+·2
Dec. 19	3182	...	$c-1\cdot0$	$f-0\cdot3$	$g+0\cdot5$	$l+2\cdot0$	$m+2\cdot0$	9·4	0	+·1	+·4
1895 Jan. 23	3217	...	$c-1\cdot3$	$f+1\cdot0$	$g+0\cdot3$	$l+2\cdot3$	...	9·0	+·1	+·1	0
Feb. 12	3237	...	$b-1\cdot2$	$c-1\cdot0$	$=f$	$g+1\cdot0$	$l+2\cdot0$	9·1	0	+·1	−·1
Feb. 23	3248	...	$b-$	$c-1\cdot5$	$f+0\cdot3$	$g-0\cdot7$	$l+1\cdot5$	9·4	0	+·1	+·1
Mar. 13	3266	...	$b-1\cdot5$	$c-1\cdot3$	$f-0\cdot3$	$g+0\cdot5$	...	9·5	−·1	+·1	+·1
Mar. 25	3278	...	$b-1\cdot5$	$c-1\cdot3$	$f-0\cdot7$	$g+0\cdot4$	$l+1\cdot5$	9·6	0	+·1	+·2

S Persei—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1895 Apr. 12	3296	...	$b-1.5$	$c-1.5$	$f-0.5$	$g+0.3$	$l+2.0$	9·5	0	+·1	0
May 1	3315	...	$b-1.5$	$c-1.5$	$f-0.5$	$g+0.4$	$l+1.5$	9·6	0	+·1	+·1
May 10	3324	...	$b-1.3$	$c-1.3$	$f+0.2$	$g+1.0$	$l+2.0$	9·2	0	+·1	−·3
May 27	3341	...	$b-1.3$	$c-1.0$	$f-0.2$	$g+1.0$	...	9·2	−·1	+·1	−·5
June 6	3351	...	$b-1.3$	$c-1.3$	$f-0.8$	$=g$	$l+2.0$	9·6	−·1	+·1	−·1
July 7	3382	...	$b-1.0$	$c-1.5$	$f-0.5$	$g+0.5$	...	9·4	−·1	+·1	−·4
Aug. 6	3412	...	$b-1.0$	$c-1.2$	$f-0.6$	$g+0.2$	$l+2.3$	9·4	0	+·1	−·3
Aug. 24	3430	...	$b-1.3$	$c-1.3$	$f-0.3$	$g+0.2$	$l+1.5$	9·5	0	+·1	−·2
Sept. 7	3444	...	$b-1.3$	$c-1.3$	$f-0.3$	$g+0.2$	$l+2.0$	9·4	0	+·1	−·3
Sept. 20	3457	...	$b-1.5$	$c-1.3$	$f-0.7$	$g+0.3$	$l+1.7$	9·6	0	+·1	0
Oct. 4	3471	...	$b-1.3$	$c-1.5$	$f-1.0$	$g+0.2$	$l+1.3$	9·8	0	+·1	+·2
Oct. 19	3486	...	$a-1.6$	$b-1.3$	$c-1.3$	$f-0.5$	$g+0.3$	9·5	−·1	+·1	−·1
Oct. 29	3496	...	$b-1.2$	$c-1.5$	$f-1.0$	$g+0.2$	$l+2.0$	9·6	0	+·1	+·1
Nov. 13	3511	...	$b-1.0$	$c-1.3$	$f-0.3$	$g+0.5$	...	9·3	−·1	+·1	−·2
Dec. 1	3529	...	$b-1.3$	$c-1.3$	$f-0.7$	$g+0.3$	...	9·6	−·1	+·1	+·2
Dec. 31	3559	...	$b-1.5$	$c-1.3$	$f-0.7$	$g+0.2$	...	9·6	−·1	+·1	+·4
1896 Jan. 19	3578	...	$b-1.5$	$c-1.3$	$f-0.3$	$g+0.5$	...	9·5	−·1	+·1	+·4
Feb. 17	3607	...	$a-1.7$	$b-1.2$	$c-1.2$	$=f$	$g+1.0$	9·2	−·1	+·1	+·2
Mar. 1	3620	...	$b-1.3$	$c-1.3$	$f+0.3$	$g+0.7$	$l+1.5$	9·3	0	+·1	+·5
Mar. 23	3642	...	$a-1.3$	$b-1.0$	$c-0.8$	$f+0.6$	$g+1.2$	8·9	0	+·1	+·1
Apr. 16	3666	...	$c-1.3$	$=f$	$g+0.7$	...	...	9·2	0	+·1	+·5
Apr. 28	3678	...	$a-1.5$	$b-1.2$	$c-1.0$	$f+0.5$	$g+1.3$	9·0	0	+·1	+·3
May 12	3692	...	$b-0.7$	$c-1.0$	$f+0.3$	$g+1.0$	...	8·9	0	+·1	+·2
May 19	3699	...	$a-1.3$	$b-1.0$	$c-1.0$	$f+1.0$	$g+1.5$	8·8	0	+·1	+·1
May 31	3711	...	$a-1.2$	$b-0.7$	$c-1.0$	$f+0.6$	$g+1.2$	8·8	0	+·1	+·1
June 17	3728	...	$a-1.0$	$b-0.5$	$c-0.7$	$f+0.6$	$g+1.2$	8·7	0	+·1	0
June 29	3740	...	$b-1.2$	$c-1.2$	$f+0.2$	$g+1.0$	$l+1.8$	9·2	0	+·1	+·5
July 11	3752	...	$a-1.3$	$b-1.0$	$c-0.7$	$f+1.0$	$g+1.7$	8·7	0	+·1	0
July 26	3767	...	$a-1.3$	$b-0.7$	$c-1.0$	$f+0.2$	$g+1.0$	9·0	0	+·1	+·2
Aug. 4	3776	...	$b-1.0$	$c-1.0$	$=f$	$g+1.0$	$l+2.0$	9·1	0	+·1	+·3
Aug. 16	3788	...	$a-1.4$	$b-0.6$	$c-1.0$	$=f$	$g+0.7$	9·1	−·1	+·1	+·2
Sept. 7	3810	...	$b-1.2$	$c-1.0$	$=f$	$g+1.3$	...	9·0	−·1	+·1	+·1
Sept. 20	3823	...	$b-1.2$	$c-1.0$	$f+0.3$	$g+1.0$	...	9·0	0	+·1	+·1
Oct. 4	3837	...	$b-1.2$	$c-1.2$	$f+0.2$	$g+1.0$	...	9·1	0	+·1	+·2
Oct. 19	3852	...	$b-1.3$	$c-1.0$	$f+0.3$	$g+1.0$	$k+1.5$	9·1	0	+·1	+·2
Nov. 3	3867	...	$b-1.0$	$c-1.0$	$f+0.2$	$g+0.7$	$k+1.5$	9·1	0	+·1	+·2
1897 Jan. 1	3926	...	$b-1.3$	$c-1.0$	$f-0.3$	$g+0.3$	$l+1.5$	9·5	0	+·1	+·6
Jan. 26	3951	...	$c-1.0$	$f-0.3$	$g+0.7$	$k+1.2$	...	9·2	0	+·1	+·2
Feb. 22	3978	...	$c-1.0$	$=f$	$g+0.7$	$k+1.5$	$l+2.0$	9·2	+·1	+·1	+·3
Mar. 15	3999	...	$b-1.0$	$c-1.2$	$=f$	$g+0.7$	$k+1.2$	9·3	0	+·1	+·2
Apr. 14	4029	...	$c-1.0$	$f-0.2$	$g+1.0$	$k+1.6$	$l+2.0$	9·1	0	+·1	0
May 13	4058	...	$b-1.0$	$c-1.2$	$f-0.3$	$g+1.3$	...	9·1	−·1	+·1	−·3
June 20	4096	...	$b-1.2$	$c-1.2$	$=f$	$g+1.0$	$k+1.3$	9·2	0	+·1	−·2
July 12	4118	...	$b-1.5$	$c-1.2$	$=f$	$g+0.8$	...	9·3	−·1	+·1	−·2
Aug. 25	4162	...	$c-1.5$	$f-1.0$	$g+0.4$	$k+1.0$	$l+2.0$	9·6	0	+·1	+·1
Sept. 6	4174	...	$c-1.5$	$f-0.7$	$g+0.3$	$k+1.4$	$l+2.0$	9·5	0	+·1	0

S Persei—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1897 Sept. 18	4186	...	$b-2\cdot0$	$c-1\cdot3$	$f-0\cdot6$	$g+0\cdot4$	$k+2\cdot5$	9·4	0	+·1	−·1
Oct. 3	4201	...	$b-1\cdot5$	$c-2\cdot0$	$f-0\cdot7$	$g+0\cdot3$	$k+1\cdot7$	9·6	0	+·1	+·2
Oct. 21	4219	...	$c-1\cdot5$	$f-1\cdot0$	$g+0\cdot3$	$k+1\cdot5$	$l+2\cdot0$	9·5	0	+·1	+·1
Nov. 1	4230	...	$b-1\cdot5$	$c-1\cdot5$	$f-1\cdot0$	$g+0\cdot4$	$k+1\cdot3$	9·7	0	+·1	+·3
Nov. 18	4247	..	$c-1\cdot3$	$f-1\cdot0$	$g+0\cdot3$	$k+2\cdot0$	$l+2\cdot5$	9·3	0	+·1	0
Dec. 6	4265	...	$b-1\cdot5$	$c-1\cdot5$	$f-0\cdot3$	$g+0\cdot7$	$k+2\cdot0$	9·3	0	+·1	+·1
1898 Feb. 5	4326	...	$b-1\cdot0$	$c-1\cdot0$	$=f$	$g+1\cdot0$	$k+2\cdot0$	9·0	0	+·1	+·4
Mar. 7	4356	...	$b-1\cdot0$	$c-1\cdot0$	$f+1\cdot3$	$g+2\cdot0$	$k+2\cdot0$	8·5	+·1	+·1	+·3
Mar. 29	4378	...	$b-0\cdot5$	$=c$	$f+1\cdot5$	$g+2\cdot0$	$k+2\cdot5$	8·1	+·1	+·1	0
Apr. 12	4392	...	$b-0\cdot3$	$c+0\cdot7$	$f+1\cdot3$	$g+2\cdot0$	$k+2\cdot5$	8·0	+·2	+·1	0
Apr. 23	4403	...	$b+0\cdot5$	$c+1\cdot0$	$f+2\cdot0$	$g+2\cdot6$	$k+4\cdot0$	7·2	+·3	+·1	−·7
May 6	4416	...	$b-0\cdot3$	$c+1\cdot0$	$f+1\cdot5$	$g+2\cdot0$	$k+3\cdot0$	7·4	+·2	+·1	−·5
May 28	4438	...	$b+0\cdot8$	$c+0\cdot2$	$f+1\cdot5$	$g+2\cdot0$	...	7·7	+·3	+·1	−·1
June 10	4451	...	$a-1\cdot5$	$=b$	$=c$	$f+1\cdot6$	$g+2\cdot3$	8·2	+·1	+·1	+·1
June 25	4466	...	$b-1\cdot0$	$c+0\cdot3$	$f+1\cdot0$	$g+1\cdot5$	$k+3\cdot0$	8·2	+·2	+·1	+·1
July 7	4478	...	$b-0\cdot7$	$c+0\cdot3$	$f+1\cdot3$	$g+2\cdot2$	$k+3\cdot0$	8·0	+·2	+·1	−·1
July 17	4488	...	$b-0\cdot5$	$=c$	$f+1\cdot0$	$g+2\cdot0$	$k+3\cdot0$	8·1	+·1	+·1	−·1
July 31	4502	...	$b-0\cdot7$	$c-0\cdot3$	$f+1\cdot5$	$g+2\cdot0$	$k+3\cdot0$	8·1	+·1	+·1	−·1
Aug. 13	4515	...	$b-1\cdot0$	$c-0\cdot5$	$=f$	$g+1\cdot0$	$k+2\cdot0$	8·9	0	+·1	+·6
Sept. 18	4551	...	$b-0\cdot3$	$c-0\cdot3$	$f+1\cdot5$	$g+2\cdot0$	$k+2\cdot5$	8·1	+·1	+·1	−·2
Oct. 3	4566	...	$b-1\cdot0$	$c-0\cdot4$	$f+1\cdot3$	$g+1\cdot6$	$k+2\cdot0$	8·5	+·1	+·1	+·2
Oct. 19	4582	...	$b-0\cdot7$	$c-0\cdot5$	$f+1\cdot0$	$g+1\cdot5$	$k+2\cdot5$	8·4	+·1	+·1	+·1
Oct. 30	4593	...	$b-1\cdot0$	$c-0\cdot3$	$f+1\cdot5$	$g+2\cdot0$	$k+2\cdot3$	8·3	+·1	+·1	0
Nov. 22	4616	...	$b-1\cdot3$	$c-0\cdot7$	$f+1\cdot3$	$g+1\cdot8$	$k+2\cdot5$	8·5	+·1	+·1	+·2
Dec. 28	4652	...	$b-1\cdot3$	$c-1\cdot0$	$f+0\cdot3$	$g+1\cdot0$	$k+2\cdot0$	9·0	+·1	+·1	+·7
1899 Jan. 14	4669	...	$b-1\cdot0$	$c-1\cdot0$	$=f$	$g+0\cdot5$	$k+2\cdot0$	9·1	0	+·1	+·7
Feb. 21	4707	...	$b-1\cdot3$	$c-1\cdot0$	$f+1\cdot3$	$g+2\cdot0$	$k+2\cdot5$	8·5	+·1	+·1	+·2
Mar. 14	4728	...	$b-1\cdot3$	$c-0\cdot5$	$f+1\cdot0$	$g+1\cdot5$	$k+2\cdot0$	8·7	+·1	+·1	+·4
Apr. 8	4753	...	$b-1\cdot0$	$c-0\cdot5$	$f+1\cdot3$	$g+2\cdot0$	$k+2\cdot5$	8·3	+·1	+·1	0
May 4	4779	...	$b-0\cdot5$	$c-0\cdot5$	$f+1\cdot0$	$g+2\cdot0$	$k+2\cdot5$	8·3	+·1	+·1	−·1
June 3	4809	...	$b-0\cdot6$	$c-1\cdot0$	$f+1\cdot0$	$g+2\cdot0$	$k+2\cdot7$	8·4	+·1	+·1	−·1
July 14	4850	...	$b-2\cdot0$	$c-1\cdot5$	$f+0\cdot7$	$g+1\cdot5$	$k+2\cdot5$	9·0	+·1	+·1	+·3
July 29	4865	...	$b-1\cdot5$	$c-1\cdot3$	$f+0\cdot3$	$g+1\cdot0$	$k+2\cdot0$	9·1	+·1	+·1	+·3
Aug. 9	4876	...	$b-2\cdot0$	$c-2\cdot0$	$f-0\cdot5$	$g+0\cdot3$	$k+1\cdot5$	9·7	−·1	+·1	+·6
Aug. 19	4886	...	$b-2\cdot0$	$c-1\cdot5$	$f-0\cdot2$	$g+0\cdot8$	$k+1\cdot5$	9·5	−·1	+·1	+·4
Aug. 26	4893	...	$b-2\cdot0$	$c-1\cdot5$	$f-0\cdot7$	$g+0\cdot3$	$k+1\cdot5$	9·7	−·1	+·1	+·5
Sept. 3	4901	...	$b-2\cdot0$	$c-2\cdot0$	$f-0\cdot6$	$g+0\cdot6$	$k+1\cdot3$	9·7	−·1	+·1	+·5
Sept. 16	4914	...	$b-1\cdot5$	$c-2\cdot0$	$f-0\cdot7$	$g+0\cdot7$	$k+1\cdot7$	9·6	−·1	+·1	+·3
Sept. 27	4925	...	$b-2\cdot0$	$c-2\cdot0$	$f-0\cdot7$	$g+0\cdot7$	$k+1\cdot3$	9·7	−·1	+·1	+·3
Oct. 5	4933	...	$b-2\cdot3$	$c-2\cdot0$	$f-0\cdot7$	$g+0\cdot3$	$k+1\cdot5$	9·8	−·1	+·1	+·4
Oct. 13	4941	...	$b-2\cdot5$	$c-2\cdot0$	$f-1\cdot0$	$g+0\cdot3$	$k+1\cdot5$	9·9	−·1	+·1	+·4
Oct. 25	4953	...	$b-2\cdot5$	$c-2\cdot0$	$f-1\cdot0$	$g-0\cdot3$	$k+1\cdot5$	10·1	−·1	+·1	+·5
Nov. 17	4976	...	$b-2\cdot0$	$c-2\cdot0$	$f-0\cdot7$	$g+0\cdot3$	$k+1\cdot3$	9·8	−·1	+·1	0
Dec. 4	4993	...	$b-2\cdot0$	$c-2\cdot0$	$f-1\cdot0$	$=g$	$k+1\cdot0$	10·0	−·1	+·1	0

S PERSEI—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		G.M.T.
									Scale.	Stars.	
											h m
1900 Jan. 5	5025	...	$b-1\cdot3$	$c-1\cdot7$	$f-1\cdot0$	$g+0\cdot2$	$k+1\cdot3$	9·7	$-\cdot1$	$+\cdot1$	...
Jan. 25	5045	...	$c-2\cdot0$	$=f$	$g+0\cdot2$	$k+1\cdot5$	$l+2\cdot0$	9·5	$+\cdot1$	$+\cdot1$	...
Mar. 12	5091	...	$b-1\cdot3$	$c-1\cdot0$	$f-0\cdot3$	$g+0\cdot7$	$k+1\cdot5$	9·3	$-\cdot1$	$+\cdot1$	8 20
Mar. 29	5108	...	$b-1\cdot5$	$c-1\cdot0$	$f+0\cdot3$	$g+1\cdot0$	$k+1\cdot5$	9·1	$+\cdot1$	$+\cdot1$	7 50
Apr. 10	5120	...	$b-2\cdot0$	$c-2\cdot0$	$f+0\cdot2$	$g+1\cdot0$	$k+1\cdot5$	9·5	$+\cdot1$	$+\cdot1$	8 30
Apr. 28	5138	...	$b-2\cdot0$	$c-1\cdot5$	$f-0\cdot2$	$g+1\cdot0$	$k+1\cdot7$	9·4	$-\cdot1$	$+\cdot1$	9 50
May 28	5168	...	$a-2\cdot0$	$b-1\cdot0$	$c-1\cdot5$	$f+0\cdot2$	$g+1\cdot4$	9·2	$-\cdot1$	$+\cdot1$	9 50
June 21	5192	...	$b-1\cdot0$	$c-1\cdot3$	$f+0\cdot4$	$g+1\cdot0$	...	9·0	0	$+\cdot1$	9 30
July 10	5211	...	$c-1\cdot5$	$f-0\cdot3$	$g+0\cdot7$	$k+2\cdot0$	$l+2\cdot5$	9·1	$+\cdot1$	$+\cdot1$	10 50
July 25	5226	...	$b-1\cdot0$	$c-1\cdot5$	$f+1\cdot0$	$g+1\cdot5$	$k+2\cdot0$	8·8	$+\cdot1$	$+\cdot1$	9 40
Aug. 14	5246	...	$b-1\cdot3$	$c-1\cdot2$	$f+0\cdot3$	$g+1\cdot2$	$k+2\cdot0$	9·0	$+\cdot1$	$+\cdot1$	9 30
Sept. 4	5267	...	$b-1\cdot0$	$c-1\cdot5$	$f+0\cdot8$	$g+1\cdot5$	$k+3\cdot0$	8·6	$+\cdot1$	$+\cdot1$	10 20
Oct. 14	5307	...	$b-0\cdot5$	$c-0\cdot7$	$f+1\cdot3$	$g+2\cdot0$	$k+2\cdot5$	8·3	$+\cdot1$	$+\cdot1$	7 50
Nov. 2	5326	...	$b+0\cdot2$	$=c$	$f+1\cdot5$	$g+2\cdot3$	$k+2\cdot5$	7·9	$+\cdot2$	$+\cdot1$	7 0
Nov. 30	5354	...	$b+0\cdot5$	$c+1\cdot0$	$f+1\cdot8$	$g+2\cdot5$	$k+3\cdot0$	7·4	$+\cdot3$	$+\cdot1$	6 30
Dec. 13	5367	...	$b+1\cdot5$	$c+1\cdot3$	$f+2\cdot3$	$g+2\cdot8$	$k+3\cdot0$	7·0	$+\cdot3$	$+\cdot1$	8 40
Dec. 28	5382	...	$b+1\cdot3$	$c+1\cdot0$	$f+1\cdot8$	$g+2\cdot3$	$k+3\cdot0$	7·3	$+\cdot3$	$+\cdot1$	7 30

R Aurigæ.

R. A. $5^h\ 9^m\ 13^s$. Dec. $+53°\ 28'·5$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1889 Jan. 2	1005	...	6−1·2	...	...	...	...	10·6	−·2	−·1	...
Feb. 23	1057	...	=6	...	...	...	...	9·4	0	−·1	−·4
Mar. 16	1078	...	4−1·0	5+1·0	6+0·3	7+0·2	=9	8·9	+·1	−·2	−·1
Apr. 6	1099	...	4−1·0	5+1·0	6+1·0	7+0·7	=9	8·7	+·1	−·2	+·1
Apr. 18	1111	...	3−2·0 9+1·0	=4	6+2·0	7+1·0	8+2·0	7·8	+·2	−·1	−·3
Apr. 27	1120	...	1+0·5	3−1·5	4+0·5	6+2·0	7+1·0	7·6	+·2	−·1	−·3
May 4	1127	...	3−2·0	5+2·0	7+1·3	8+2·0	9+1·3	7·6	+·2	−·1	−·1
May 10	1133	...	1+1·3	3−1·0	4+1·0	5+2·0	7+2·0	7·0	+·2	−·1	−·7
May 15	1138	...	1+1·5	3−1·0	4+1·0	7+2·0	9+2·0	6·9	+·2	−·1	−·8
May 22	1145	...	=1	2+0·2	3−2·0	4+0·3	7+1·3	7·7	+·1	0	−·1
June 5	1159	...	4+0·3	6+2·5	7+1·0	8+0·3	9+0·7	7·9	+·3	−·1	−·1
June 16	1170	...	1−0·5	2−0·8	=4	7+1·0	9+1·0	8·2	0	−·1	−·3
July 5	1189	...	4−1·0	6+0·2	7−0·5	=8	...	9·2	0	−·1	+·2
July 27	1211	...	=6	7−1·0	18+1·0	25+1·0	26+1·0	9·2	+·1	−·1	−·4
Aug. 24	1239	...	6−1·0	15+0·5	25−0·7	26−0·7	29+0·5	10·4	0	+·1	−·2
Sept. 10	1256	80	6−2·0	11−0·3	12+0·3	26−1·5	=29	10·9	−·1	0	−·6
Sept. 20	1266	80	12−0·3 29−0·5	15−0·5	25−1·0	26−1·0	27−0·3	11·1	−·2	+·1	−·8
Oct. 9	1285	80	29−1·0	=35	=36	=37	...	11·3	0	0	−1·3
Oct. 23	1299	132	35−1·0	36−1·0	37−0·5	38−0·3	...	12·0	−·2	0	−1·2
1890 Feb. 3	1402	80	12−1·3	13−1·0	29−0·5	=35	...	11·5	−·2	+·1	−1·0
Feb. 22	1421	80	6−2·0 37+1·0	=15	29−0·5	35+1·0	36+1·0	10·7	+·1	0	−1·0
Mar. 17	1444	...	12+1·0	13+0·5	25−1·0	26−0·7	29+1·3	10·2	0	+·1	−0·7
Mar. 29	1456	...	12+0·7	13+0·5	25−0·3	26−0·5	29+1·5	10·0	0	+·1	−0·6
Apr. 22	1480	...	4−2·0	6−0·3	7−1·0	25+0·2	26+0·5	9·7	−·1	−·1	−0·8
May 6	1494	...	5−0·5	6−0·6	7−1·0	25+0·5	26+0·3	9·8	−·1	−·1	−·5
May 22	1510	...	6−0·7	7−1·0	25−0·3	27−0·3	29+1·5	10·2	−·1	0	+·2
June 15	1534	...	=5	6−0·2	7−1·0	=8	9−0·6	9·6	−·2	−·1	−·1
June 24	1543	...	6−0·3	7−1·0	8+1·0	25+2·0	26+1·5	8·7	+·1	0	−·4
July 3	1552	...	4−1·0	5+1·0	6+0·8	7+0·4	8+1·0	8·6	+·2	−·1	−·1
July 15	1564	...	3−1·5	4+0·5	6+2·0	7+1·5	9+1·5	7·6	+·2	−·1	−·5
July 21	1570	...	1+1·0	3−2·0	4+1·5	7+2·0	9+2·0	7·1	+·2	−·1	−·7
Aug. 1	1581	...	3−1·5	4+1·0	5+2·0	7+1·7	9+1·5	7·5	+·2	−·1	+·3
Aug. 6	1586	...	3−1·0	5+2·5	7+2·0	8+2·5	9+2·0	6·9	+·2	−·1	−·3
Aug. 18	1598	...	3−0·5	4+1·5	7+2·0	...	...	6·8	+·1	−·1	−·5
Aug. 24	1604	...	3−1·0	4+1·5	5+2·7	7+2·0	9+2·0	7·0	+·2	−·1	−·3
Sept. 5	1616	...	3−1·0	4+1·0	5+2·0	7+1·5	9+1·5	7·4	+·2	−·1	−·2
Oct. 1	1642	...	=4	5+1·3	7+1·0	8+1·3	9+0·6	8·1	+·2	−·1	−·1
Oct. 13	1654	...	4−0·5	5+0·6	6+1·2	7+0·3	9+0·2	8·6	+·2	−·2	0

1889 Nov. 25. Not seen with 34, 80, 132, on this or following dates:—Dec. 2, Dec. 11, Dec. 20, Jan. 8.
1890 Jan. 19. Just glimpsed 132.

R Aurigæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1890 Nov. 11	1683	...	=5	6−0·2	9+0·3	25+0·5	26+0·5	9·2	+·1	0	−·2
Nov. 24	1696	...	6−1·3	7−1·7	25−1·0	26−1·0	29+1·2	10·6	−·1	0	+·5
Dec. 19	1721	...	12−1·0	13−1·0	=15	26−2·0	29+0·2	11·4	−·1	0	+·4
1891 Jan. 5	1738	...	15−0·7	29−0·7	=35	36+0·2	37+0·2	11·2	0	+·1	−·5
Feb. 1	1765	80	35−2·0	36−1·3	37−0·7	38−0·3	...	12·4	−·2	0	−·7
Mar. 4	1796	132	37−1·0	38−0·3	...	...	...	12·2	−·2	0	−1·4
Mar. 27	1819	132	38−0·5	...	...	...	...	12·2	−·2	0	−1·3
Apr. 5	1828	132	37−0·5	38+0·6	39−2·0	...	...	11·9	−·1	+·1	−1·2
Apr. 23	1846	132	29−1·7	35−1·0	36−1·0	...	...	12·2	−·2	+·1	−·7
May 4	1857	132	=37	38+0·5	...	...	...	11·2	+·1	0	−1·3
May 16	1869	...	12−0·8	13−1·0	25−1·5	26−1·5	29+0·4	11·3	−·1	+·1	−1·0
June 5	1889	...	6−1·8	25−1·3	26−1·3	29+0·6	...	10·8	−·1	+·1	−1·1
July 6	1920	...	5−1·0	6−1·0	25−0·5	26−0·8	...	10·3	−·2	0	−9
July 11	1925	...	6−1·0	7−2·0	25−0·2	26−0·5	...	10·4	−·2	−·1	−·8
Aug. 4	1949	...	4−2·3	6−1·0	=25	26+0·2	...	10·0	0	0	−·2
Aug. 28	1973	...	6−0·5	25−0·2	26−0·3	29+1·3	37+2·3	9·7	−·1	+·1	+·1
Sept. 5	1981	...	6−0·2	7−1·0	25+0·6	26+0·6	29+1·3	9·5	+·1	0	+·3
Sept. 22	1998	...	4−1·3	6+1·0	7−0·3	8+1·0	25+1·2	8·8	+·1	0	+·3
Oct. 10	2016	...	4−0·5	5+1·5	6+1·5	7+1·0	8+1·3	8·0	+·2	−·1	+·4
Oct. 28	2034	...	2+1·0	3−1·0	4+1·2	6+2·0	7+1·6	7·1	+·2	−·1	0
Nov. 19	2056	...	3−1·2	4+0·7	6+2·0	7+1·3	...	7·5	+·2	−·1	+·3
Dec. 2	2069	...	3−1·5	4+1·0	5+2·0	7+1·5	9+1·5	7·5	+·2	−·1	−·1
Dec. 19	2086	...	4−0·5	5+1·0	7+0·7	...	...	8·5	+·1	−·2	+·2
1892 Jan. 24	2122	...	4−1·0	5+0·5	6+0·5	7−0·5	26+1·0	9·1	+·1	−·1	−·1
Feb. 3	2132	...	4−1·2	5+0·3	=6	7−0·3	26+0·6	9·3	0	−·1	−·4
Mar. 1	2159	...	6−1·4	12+0·7	25−0·6	26−0·6	29+1·0	10·3	0	+·1	−·2
Mar. 19	2177	...	6−2·0	12−0·5	29+0·2	37+1·5	38+1·5	10·7	0	0	−·5
Apr. 2	2191	...	6−1·5	12−1·0	27+1·0	=29	36+0·5	10·8	0		−·9
Apr. 22	2211	...	15−1·3	29−0·5	=37	38+1·0	...	11·4	0	+·1	−·9
July 21	2301	132	37−0·5	=38	...	...	...	11·8	−·1	0	−·
July 27	2307	132	27−1·0	=37	=38	...	...	11·5	−·1	0	−·9
Aug. 10	2321	80	12−1·2	13−1·2	25−2·2	26−2·2	29−0·2	11·8	−·2	+·1	−·2
Aug. 20	2331	...	6−1·5	12+0·3	=13	26−1·0	=29	10·7	0	0	−·7
Sept. 7	2349	...	4−2·0	6−1·0	25−0·6	26−0·6	29+1·2	10·1	−·1	+·1	−·7
Sept. 17	2359	...	6−0·5	=11	12+1·0	=25	29+1·0	9·8	+·1	+·1	−·5
Oct. 5	2377	...	4−2·3	6−0·3	7−1·0	12+1·5	=26	9·8	−·1	−·1	−·6
Oct. 17	2389	...	6−0·8 29+1·0	12+1·0	13+1·0	25−0·5	26−0·5	10·0	0	+·1	+·2
Oct. 31	2403	...	6−0·5	7−1·2	8−0·7	=25	26+0·3	9·8	−·1	0	0
Nov. 10	2413	...	6−0·3	7−0·5	=8	=25	=26	9·6	−·1	0	0
Nov. 29	2432	...	4−1·0 26+1·0	5+0·3	6+0·3	7−0·3	8+0·3	9·0	+·1	0	−·1
Dec. 7	2440	...	4−1·0	5+1·0	6+0·7	7−0·3	9−0·3	9·0	−·1	−·2	−·3
Dec. 29	2462	...	4−0·5	5+1·0	6+1·0	7+0·2	9+0·6	8·5	+·2	·2	0

1891 Feb. 15. N 34, 80, 132. Air very clear.

1892 June 2, 14. Variable invisible in strong twilight.

R Aurigæ—*continued*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1893 Jan. 10	2474	...	$a-1.5$	$=e$	$f+1.0$	$g+1.4$	$m+2.0$	8·1	+·1	0	+·1
Jan. 17	2481	...	$a-1.5$	$d-0.5$	$=e$	$f+1.5$	$g+2.0$	7·7	0	+·1	−·1
Feb. 7	2502	...	$a-1.0$	$d+0.3$	$=e$	$f+1.0$	$g+1.3$	7·7	0	+·1	+·2
Feb. 14	2509	...	$a-1.3$	$d+0.6$	$e+0.8$	$f+1.5$	$g+1.8$	7·3	+·1	+·1	−·1
Feb. 26	2521	...	$a-1.7$	$d+1.0$	$e+1.0$	$f+1.3$	$g+2.0$	7·3	+·1	+·1	−·1
Mar. 7	2530	...	$a-1.5$	$d+0.4$	$e+0.5$	$f+1.0$	$g+1.5$	7·6	+·1	+·1	+·1
Mar. 11	2534	...	$a-2.0$	$d+0.2$	$=e$	$f+1.0$	$g+1.5$	7·9	+·1	+·1	+·3
Mar. 20	2543	...	$a-2.0$	$d+0.3$	$e+0.3$	$f+1.2$	$g+1.5$	7·7	+·1	+·1	−·1
Mar. 29	2552	...	$a-1.7$	$d-0.7$	$e-0.5$	$f+0.7$	$g+1.2$	8·2	0	+·1	+·1
Apr. 5	2559	...	$d-0.3$	$e-0.7$	$f+0.3$	$g+1.3$	$m+2.0$	8·5	0	0	+·1
Apr. 9	2563	...	$d-1.0$	$e-0.7$	$f+0.3$	$g+1.2$	$k+1.3$	8·6	0	+·1	+·3
Apr. 25	2579	...	$a-2.0$	$e-1.3$	$f-0.3$	$g+1.2$	$h+1.5$	8·6	0	+·1	−·2
May 9	2593	...	$d-1.0$	$e-1.4$	$f-0.7$	$=g$	$m+2.0$	9·2	−·1	0	−·2
May 20	2604	...	$e-1.5$	$f-0.6$	$=g$	$h-0.5$	$k+0.3$	9·7	−·1	0	(+·1)
June 8	2623	...	$g-1.0$, $n+0.5$	$h-1.0$	$=k$	$l-0.5$	$m+0.5$	10·6	0	0	(+·5)
June 29	2644	...	$f-2.3$	$g-2.0$	$k-1.3$	$m+0.5$	$n+1.0$	11·0	0	0	(+·1)
July 13	2658	...	$h-3.0$	$l-1.5$	$m-1.5$	$n-1.0$	...	12·6	−·1	0	(+1·1)
July 31	2676	132	$l-2.0$	$m-1.0$	$=q$	...	...	12·5	−·1	−·1	(+·1)
Aug. 15	2691	132	$l-3.0$	$m-3.0$	$q-1.0$	...	...	13·8	−·1	−·1	(+0·9)
Sept. 30	2737	132	$l-3.0$	$m-2.5$	$n-2.0$	$q-1.5$	...	13·8	−·1	0	+·2
Oct. 9	2746	132	$q-0.5$	...	...	...	...	13·3	0	0	0
Oct. 30	2767	132	$l-2.5$	$m-2.5$	$n-2.0$	$q-0.3$	...	13·3	−·1	0	+·4
Nov. 9	2777	80	$h-2.5$	$l-1.5$	$m-1.0$	$n-1.0$	$q+0.5$	12·3	−·1	0	−·1
Dec. 2	2800	...	$g-1.0$	$h-1.0$	$k-0.5$	$l+0.6$	$m+1.0$	10·4	0	0	−·7
Dec. 14	2812	...	$f-1.2$, $m+1.0$	$g-1.2$	$h-0.5$	$k-0.5$	$l+1.0$	10·2	0	0	−·2
1894 Jan. 12	2841	...	$e-1.5$	$f-1.0$	$g-0.7$	$=h$	$l+1.0$	9·8	−·1	0	0
Jan. 20	2849	...	$f-1.0$	$g-0.3$	$=h$	$l+1.0$	...	9·7	0	+·1	+·1
Jan. 30	2859	...	$e-2.0$	$f-1.0$	$g-1.0$	$h+0.5$	$l+1.5$	9·8	0	0	+·2
Feb. 8	2868	...	$e-1.5$	$f-0.5$	$g-0.7$	$=k$	$n+1.0$	9·7	−·1	0	0
Feb. 18	2878	...	$e-1.5$	$f-1.0$	$g-0.5$	$=h$	$l+1.0$	9·8	−·1	0	+·1
Feb. 28	2888	...	$e-1.5$	$f-0.5$	$g+0.5$	$=h$	$k+1.0$	9·3	0	0	−·1
Mar. 15	2903	...	$d-1.0$	$e-1.0$	$f-0.4$	$g+0.6$	$h+1.0$	9·0	0	+·1	−·1
Mar. 23	2911	...	$a-2.0$	$e-1.0$	$f-0.3$	$g+1.0$	$h+1.0$	8·7	0	+·1	−·1
Apr. 12	2931	...	$a-1.5$	$e+0.5$	$f+1.3$	$g+1.3$	$l+2.0$	7·9	+·1	0	+·2
Apr. 28	2947	...	$a-1.0$	$d+1.5$	$e+1.5$	$f+2.0$	$g+2.5$	6·7	+·1	+·1	−·1
May 10	2959	...	$a-1.3$	$d+1.0$	$e+1.0$	$f+1.5$	$g+1.8$	7·2	+·1	+·1	+·6
May 22	2971	...	$a-1.0$	$d+1.3$	$e+1.3$	$f+1.7$	$g+2.0$	6·9	+·1	+·1	0
June 18	2998	...	$a-1.5$	$=d$	$=e$	$f+1.0$	$g+1.5$	7·8	0	+·1	0
July 3	3013	...	$a-2.0$	$e-1.0$	$f+0.5$	$g+1.0$	$k+1.5$	8·4	0	0	−·1
July 19	3029	...	$a-2.5$	$e-1.0$	$f-0.4$	$g+0.6$	$k+1.3$	8·8	0	0	−·3
Aug. 15	3056	...	$f-1.2$	$g-0.6$	$=h$	$k+0.3$	$m+1.3$	9·8	0	0	−·4
Aug. 30	3071	...	$f-1.5$	$g-1.0$	$k-0.5$	$=l$	$m+0.5$	10·5	0	0	−·5

1893 Aug. 30. Not seen 34, 80, 132.
1894 Nov. 15. Not seen 34, 80, 132. Air very clear.

1893 Sept. 11. Just glimpsed with 132.

R AURIGÆ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1894 Sept. 11	3083	...	$g-1.3$	$h-1.0$	$k-0.6$	$=l$	$m+0.5$	10.7	0	−.1	−1.0
Sept. 30	3102	80	$h-2.0$	$l-1.0$	$m-1.0$	$n-1.0$	$=q$	12.2	−.1	0	−.3
Oct. 25	3127	132	$l-1.5$	$m-1.0$	$n-1.0$	$q-0.5$	...	12.5	−.1	0	−.7
Nov. 30	3163	132	$q-1.0$	...	...	...	...	13.8	−.1	0	+.3
Dec. 15	3178	132	$q-1.0$	...	...	...	...	13.8	−.1	0	+.4
Dec. 31	3194	132	$q-1.0$	...	...	...	...	13.8	−.1	0	+.6
1895 Jan. 17	3211	132	$q-0.3$	...	...	...	...	13.1	−.1	0	+.4
Feb. 12	3237	...	$f-2.5$ $=n$	$g-2.0$	$k-1.0$	$l-0.5$	$m-0.5$	11.2	−.1	0	−.3
Feb. 23	3248	...	$e-2.3$	$f-1.3$	$g-1.0$	$l+0.5$	$m+0.5$	10.3	0	0	−.6
Mar. 7	3260	...	$e-1.3$	$f-0.7$	$g-0.5$	$l+1.2$	$m+1.2$	9.6	0	0	−.8
Mar. 18	3271	...	$e-1.5$	$f-0.6$	$=g$	$h+1.0$	$l+2.0$	9.2	0	0	−.8
Apr. 12	3296	...	$f-1.0$	$g-0.6$	$h+0.6$	$l+1.0$	$m+1.5$	9.7	0	+.1	+.3
May 2	3316	...	$f-1.0$	$g-0.7$	$=h$	$l+1.0$	$m+1.5$	9.8	0	+.1	+.4
May 13	3327	...	$e-1.5$	$f-0.6$	$=g$	$=h$	$l+1.0$	9.6	0	0	+.1
May 27	3341	...	$e-1.3$	$f-0.5$	$g+0.6$	$h+0.5$	...	9.2	0	0	−.3
June 7	3352	...	$e-1.5$	$f-1.0$	$g+0.3$	$h+1.0$	...	9.3	0	0	0
June 24	3369	...	$a-1.5$	$e-1.0$	$f+0.3$	$g+1.3$	$k+1.5$	8.3	0	0	−.5
July 4	3379	...	$a-1.5$	$d-0.5$	$e+0.5$	$f+1.3$	$g+2.0$	7.6	0	+.1	−.3
Aug. 3	3409	...	$a-1.3$	$d+1.0$	$e+1.0$	$f+1.3$	$g+2.0$	7.2	+.1	−.2	+.1
Aug. 23	3429	...	$a-1.5$	$d+0.3$	$e+1.0$	$f+1.3$	$g+2.0$	7.4	+.1	+.1	−.3
Sept. 7	3444	...	$a-1.3$	$=d$	$e-0.2$	$f+1.0$	$g+1.2$	7.9	0	+.1	−.2
Sept. 20	3457	...	$a-2.0$	$e-0.5$	$f+1.0$	$g+1.3$	$m+2.0$	8.2	0	0	−.3
Oct. 4	3471	...	$a-2.0$	$d-0.7$	$e-1.3$	$f+0.3$	$g+1.0$	8.5	0	0	−.2
Oct. 17	3484	...	$e-1.0$	$=f$	$g+1.0$	$h+1.3$	$k+1.3$	8.7	+.1	0	−.2
Oct. 27	3494	...	$f-0.6$	$g-0.2$	$=h$	$l+1.3$	$m+1.6$	9.6	0	0	+.3
Nov. 14	3512	...	$f-1.3$	$g-1.0$	$h-0.3$	$l+0.7$	$m+0.7$	10.2	0	+.1	0
Dec. 7	3535	...	$h-1.2$	$k-1.6$	$l-0.3$	$=m$	$=n$	11.2	−.1	−.1	.4
1896 Jan. 8	3567	80	$h-3.0$	$l-1.5$	$m-2.0$	$n-1.5$	$=q$	12.8	−.1	0	0
Apr. 17	3667	132	$l-3.0$	$m-2.0$	$n-1.5$	$q+0.3$	...	13.1	0	0	0
Apr. 28	3678	80	$k-2.0$	$l-1.2$	$m-1.0$	$n-1.0$	$q+1.0$	12.0	−.1	−.1	−.9
May 9	3689	...	$g-2.0$	$h-1.7$	$k-1.3$	$l-1.3$	$m-1.0$	11.7	−.1	0	−.6
May 19	3699	...	$g-1.6$	$h-1.2$	$k-1.2$	$l-0.5$	$=m$	11.1	−.1	0	−.8
June 17	3728	...	$a-2.5$	$e-1.5$	$g-1.0$	$h-0.3$	$l+1.0$	9.7	−.1	+.1	−1.0
June 29	3740	...	$e-1.5$	$f-1.2$	$g-0.7$	$=h$	...	9.9	−.1	+.1	−.4
July 12	3753	...	$a-2.5$	$e-1.5$	$f-0.5$	$g-0.7$	...	9.4	−.1	+.1	−.6
July 26	3767	...	$f-1.0$	$g-0.3$	$=h$	$l+1.0$	$m+1.0$	9.9	0	0	+.2
Aug. 12	3784	...	$f-1.0$	$g-1.0$	$=h$	$l+0.5$	$m+0.5$	10.2	0	0	+.6
Aug. 18	3790	...	$f-1.0$	$g-0.7$	$h-0.3$	$l+0.3$	$m+0.3$	10.3	0	0	+.7
Sept. 2	3805	...	$f-1.3$	$g-1.0$	$=h$	$l+1.0$	$m+1.0$	10.1	0	0	+.7
Sept. 18	3821	...	$f-0.4$	$g-0.2$	$h+0.3$	$l+1.3$	$m+1.3$	9.5	0	0	+.4
Oct. 4	3837	...	$=e$	$f+1.3$	$g+1.5$	...	...	7.9	+.1	0	−.3
Oct. 19	3852	...	$a-1.5$	$d+1.0$	$e+1.0$	$f+1.7$	$g+2.0$	7.2	+.1	+.1	−.2
Oct. 31	3864	...	$a-1.0$	$d+1.0$	$e+1.0$	$f+1.7$	$g+2.0$	7.1	+.1	+.1	0
Nov. 10	3874	...	$a-1.2$	$d+1.0$	$e+0.7$	$f+1.0$	$g+1.3$	7.4	+.1	+.1	+.3

1896 Jan. 30. Not seen 34, 80, 132: nor on Feb. 17, Mar. 1, 23.

R Aurigæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1896 Nov. 20	3884	...	$a-1.5$	$d-0.4$	$e+0.6$	$f+1.5$	$g+2.0$	7·6	0	+·1	+ ·1
Nov. 29	3893	...	$a-1.5$	$d-0.5$	$e+1.0$	$f+1.0$	$g+1.5$	7·8	0	+·1	− ·2
Dec. 11	3905	...	$a-2.5$	$d-1.0$	$e-1.0$	$f+0.5$	$g+1.0$	8·6	0	+·1	+ ·1
1897 Feb. 3	3959	...	$f-1.3$	$g-1.3$	$k-0.5$	$=m$	...	10·7	−·1	−·1	− ·1
Mar. 13	3997	...	$f-1.5$	$g-1.3$	$h-1.0$	$l-0.3$	$=m$	10·8	−·1	0	−1·6
Apr. 14	4029	80	$h-2.0$	$k-1.5$	$l-1.0$	$m-1.0$	$=n$	11·7	−·1	−·1	−1·5
May 7	4052	80	$h-2.0$	$l-1.3$	$m-1.0$	...	...	11·9	−·1	0	...
May 22	4067	132	$l-2.0$	$m-2.0$	$n-1.0$	$=q$	...	12·8	−·1	−·1	...
June 11	4087	132	$h-3.0$	$l-2.0$	$m-2.0$	$n-1.0$	...	12·8	−·1	0	...
July 23	4129	80	$g-3.0$	$h-2.0$	$l-1.0$	$m-0.3$	$n-0.3$	11·7	−·1	0	...
Aug. 25	4162	..	$f-2.0$	$g-1.0$	$h-1.0$	$=l$	$=m$	10·8	−·1	0	...
Sept. 6	4174	...	$f-1.6$	$g-1.3$	$h-1.0$	$=l$	$m+0.5$	10·7	0	0	...
Sept. 18	4186	...	$f-1.7$	$g-1.0$	$h-1.0$	$l+0.5$	$m+1.0$	10·4	0	0	− ·5
Oct. 3	4201	. .	$f-1.3$	$g-0.7$	$h-0.5$	$l+0.7$	$m+1.3$	10·1	0	0	− ·5
Oct. 21	4219	...	$f-1.2$	$g-0.8$	$=h$	$l+0.7$	$m+1.0$	10·1	0	0	− ·4
Nov. 2	4231	...	$f-1.0$	$g-0.7$	$h-0.3$	$l+0.5$	$m+1.0$	10·1	0	0	− ·3
Nov. 18	4247	...	$f-1.5$	$g-1.2$	$h-0.5$	$l+1.0$	$m+1.5$	10·1	0	0	− ·2
Dec. 6	4265	...	$e-1.3$	$f-0.7$	$g+0.5$	$h+1.0$	$m+2.0$	9·1	0	0	− ·3
Dec. 18	4277	...	$a-2.0$	$e+0.3$	$f+1.3$	$g+1.5$	$h+1.5$	7·9	+·1	+·1	− ·5
1898 Feb. 8	4329	...	$a-1.5$	$d+0.5$	$e+1.0$	$f+2.0$	$g+2.0$	7·2	+·2	+·1	0
Feb. 14	4335	...	$a-2.0$	$=d$	$e+1.0$	$f+2.0$	$g+2.5$	7·3	+·1	+·1	− ·2
Feb. 26	4347	..	$a-2.0$	$=d$	$e-0.6$	$f+1.0$	$g+1.0$	8·1	0	+·1	+ ·2
Mar. 14	4363	...	$a-2.0$	$d-1.0$	$=e$	$f+1.0$	$h+1.7$	8·3	0	+·1	− ·2
Apr. 4	4384	...	$e-1.0$	$=f$	$g+1.0$	$h+1.0$	$m+2.0$	8·8	+·1	0	− ·3
Apr. 15	4395	...	$=f$	$g+1.0$	$h+1.0$	$l+1.3$	$m+2.0$	8·9	+·2	0	− ·4
Apr. 30	4410	...	$f-1.0$	$g-0.3$	$=h$	$l+1.0$	$m+1.3$	9·8	0	0	− ·2
May 28	4438	...	$e-3.0$	$g-1.2$	$h-1.2$	$l-0.8$	$m-0.8$	11·2	−·2	0	...
June 10	4451	...	$f-1.3$	$g-1.0$	$h-1.0$	$l-0.5$	$=m$	10·8	−·2	0	...
July 11	4482	132	$h-3.0$	$l-2.0$	$m-2.0$	...	...	12·8	−·2	0	...
July 17	4488	132	$h-2.0$	$l-1.5$	$m-1.0$	$n-0.5$	$=q$	12·2	−·2	0	...
Oct. 19	4582	132	$l-2.0$	$m-2.0$	$n-1.0$	$q-0.3$	...	12·8	−·2	0	...
Oct. 31	4594	80	$g-2.0$	$h-1.5$	$l-1.0$	$m-1.0$	$q+1.3$	11·6	−·1	0	...
Dec. 7	4631	...	$g-1.2$	$h-0.3$	$k-1.0$	$=l$	$=m$	10·7	−·1	0	(− ·9)
Dec. 15	4639	...	$f-1.0$	$g-1.0$	$h+0.3$	$l+1.3$	$m+1.3$	9·8	+·1	0	(−1·3)
Dec. 22	4646	...	$a-3.0$	$e-1.3$	$=f$	$g+0.5$	$h+1.0$	9·0	0	+·1	(−1·9)
1899 Jan. 5	4660	...	$a-3.0$	$d-2.0$	$e-1.4$	$f+1.0$	$g+0.1$	9·0	−·1	+·1	(−1·7)
Feb. 1	4687	...	$a-2.5$	$d-1.0$	$e-1.0$	$=f$	$g+1.0$	8·7	−·1	+·1	(−1·2)
Feb. 21	4707	...	$e-1.5$	$f-0.3$	$g+0.7$	$h+1.3$	$k+1.0$	9·1	+·1	0	0
Feb. 25	4711	...	$e-2.0$	$f-0.5$	$g+0.5$	$h+1.0$	$l+1.7$	9·2	+·1	0	+ ·2
Mar. 4	4718	...	$e-2.0$	$=f$	$g+1.0$	$h+1.0$	$l+2.0$	8·9	+·1	0	+ ·1
Mar. 15	4729	...	$e-1.0$	$=f$	$g+1.0$	$h+1.0$	$l+2.0$	8·7	+·1	0	+ ·3
Mar. 24	4738	...	$d-1.5$	$e-1.0$	$f+1.0$	$g+1.3$	$h+1.3$	8·5	+·1	+·1	+ ·5
Apr. 8	4753	...	$a-1.5$	$e+1.0$	$h+2.0$	$l+2.5$	$m+2.5$	8·0	+·2	0	+ ·4

1897 June 20. Barely seen 132: in twilight of sunset horizon.

1898 July 31. Not seen 34, 80, 132: nor on Aug. 27. On Sept. 10 just seen 132. On Sept. 23 and Oct. 3 not seen 34, 80, 132. Air very clear.

1899 Oct. 13. Not seen 34, 80, 132: nor on Oct. 30, Nov. 19, Dec. 4.

R Aurigæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1899 Apr. 17	4762	...	$a-1\cdot3$	$d+1\cdot0$	$e+1\cdot0$	$f+2\cdot0$	$g+3\cdot0$	6·9	+·2	+·1	−·4
Apr. 26	4771	...	$a-1\cdot7$	$d+1\cdot0$	$e+1\cdot3$	$f+2\cdot0$	$g+2\cdot5$	7·0	+·2	+·1	−·2
May 3	4778	...	$a-2\cdot0$	$d+1\cdot0$	$e+1\cdot0$	$f+2\cdot0$	$h+3\cdot0$	7·1	+·2	+·1	0
May 22	4797	...	$a-1\cdot5$	$d+1\cdot5$	$e+0\cdot5$	$f+2\cdot0$	$g+2\cdot0$	7·1	+·2	+·1	...
May 28	4803	...	$a-2\cdot0$	$e+1\cdot0$	$f+1\cdot5$	$g+2\cdot3$	$h+2\cdot0$	7·5	+·2	+·1	...
June 6	4812	...	$a-2\cdot5$	$d-0\cdot5$	$e+0\cdot3$	$f+1\cdot5$	$g+2\cdot0$	7·9	+·1	+·1	...
June 10	4816	...	$a-2\cdot5$	$d+0\cdot7$	$e-0\cdot5$	$f+1\cdot3$	$g+1\cdot5$	7·9	+·1	+·1	...
June 29	4835	...	$a-3\cdot0$	$d-0\cdot7$	$e-1\cdot0$	$f+0\cdot5$	$h+2\cdot0$	8·6	−·1	+·1	...
July 14	4850	...	$d-2\cdot0$	$e-2\cdot3$	$f-1\cdot0$	$g+1\cdot0$	$h+1\cdot3$	9·3	−·1	+·1	..
July 29	4865	...	$f-1\cdot3$	$g-0\cdot3$	$=h$	$l+1\cdot0$	$m+2\cdot0$	9·6	0	0	...
Aug. 11	4878	...	$f-2\cdot0$	$g-0\cdot5$	$=h$	$l+0\cdot7$	$m+1\cdot0$	10·1	0	0	...
Aug. 22	4889	...	$e-3\cdot0$	$f-2\cdot0$	$g-1\cdot0$	$h-0\cdot6$	$=m$	10·7	−·2	0	...
Sept. 16	4914	...	$f-3\cdot0$	$g-3\cdot0$	$h-1\cdot7$	$l-1\cdot0$	$=m$	11·7	−·2	0	...
Sept. 28	4926	80	$h-2\cdot5$	$l-1\cdot0$	$m-1\cdot5$	$n-1\cdot0$	$=q$	12·4	−·2	0	...
Oct. 5	4933	132	$h-4\cdot0$	$l-2\cdot0$	$m-2\cdot5$	$n-1\cdot3$	$q-1\cdot0$	13·3	−·2	0	...
Dec. 30	5019	132	$k-3\cdot5$	$n-2\cdot0$	$q-1\cdot0$	...	...	13·7	−·1	−·1	...
											G.M.T. h m
1900 Jan. 5	5025	132	$g-4\cdot0$	$k-2\cdot5$	$l-2\cdot0$	$n-1\cdot5$	$q-1\cdot0$	13·1	−·2	0	...
Jan. 18	5038	...	$h-2\cdot5$	$l-1\cdot0$	$m-1\cdot5$	$n-0\cdot5$	$q+0\cdot2$	12·2	−·1	0	...
Feb. 1	5052	...	$f-2\cdot0$	$g-2\cdot0$	$l-0\cdot3$	$m-0\cdot7$	$=n$	11·3	−·2	0	...
Mar. 4	5083	...	$e-2\cdot0$, $m+1\cdot0$	$f-1\cdot4$	$g-1\cdot0$	$h-0\cdot5$	$l+0\cdot5$	10·2	−·1	0	...
Mar. 16	5095	...	$f-1\cdot5$	$g-1\cdot0$	$h-0\cdot7$	$l+0\cdot3$	$m+1\cdot0$	10·3	0	0	...
Mar. 27	5106	...	$e-3\cdot0$	$f-2\cdot0$	$g-1\cdot0$	$h-0\cdot5$	$l+0\cdot5$	10·5	−·1	0	10 0
Apr. 13	5123	...	$f-1\cdot2$	$g-0\cdot8$	$h-1\cdot0$	$l+1\cdot0$	$m+0\cdot8$	10·0	0	0	8 30
Apr. 19	5129	...	$g-1\cdot2$	$h-0\cdot7$	$=k$	$l+0\cdot7$	$m+1\cdot2$	10·2	0	0	9 20
Apr. 27	5137	...	$g-1\cdot0$	$=h$	$l+1\cdot0$	$m+0\cdot5$	...	10·1	0	0	9 10
May 28	5168	...	$f-1\cdot0$	$g-0\cdot2$	$h+0\cdot5$	$k+0\cdot5$	$m+1\cdot5$	9·6	+·1	0	10 0
June 5	5176	...	$e-2\cdot0$	$f-0\cdot8$	$g+0\cdot5$	$h+1\cdot0$	$k+1\cdot0$	9·3	+·1	0	10 0
June 26	5197	...	$d-0\cdot7$	$e-1\cdot0$	$f+1\cdot3$	$g+1\cdot6$	$h+1\cdot5$	8·2	+·1	+·1	10 40
July 7	5208	...	$a-2\cdot0$	$d+1\cdot0$	$e+0\cdot7$	$f+2\cdot0$	$g+2\cdot3$	7·2	+·2	+·1	10 20
July 14	5215	...	$a-1\cdot5$	$d+1\cdot0$	$e+1\cdot0$	$f+2\cdot0$	$g+2\cdot0$	7·1	+·2	+·1	10 30
July 23	5224	...	$a-1\cdot0$	$d+1\cdot0$	$e+1\cdot0$	$f+2\cdot0$	$g+2\cdot5$	6·9	+·2	+·1	10 50
Aug. 9	5241	...	$a-2\cdot0$	$d+0\cdot7$	$e+0\cdot5$	$f+1\cdot7$	$h+2\cdot0$	7·5	+·2	+·1	9 50
Aug. 15	5247	...	$a-2\cdot0$	$d+1\cdot0$	$e+0\cdot8$	$f+1\cdot5$	$g+2\cdot3$	7·3	+·2	+·1	9 50
Aug. 23	5255	...	$a-2\cdot0$	$=d$	$e+1\cdot0$	$f+1\cdot5$	$g+2\cdot0$	7·5	+·1	+·1	9 50
Aug. 30	5262	...	$a-2\cdot0$	$e-0\cdot3$	$f+1\cdot5$	$g+2\cdot0$	$h+2\cdot5$	7·6	+·1	+·1	9 20
Sept. 8	5271	...	$d-2\cdot0$	$e-1\cdot3$	$f+1\cdot0$	$g+1\cdot7$	$h+2\cdot0$	8·5	+·1	+·1	9 50
Sept. 15	5278	...	$e-1\cdot0$	$f+1\cdot0$	$g+1\cdot6$	$h+1\cdot5$	$l+2\cdot0$	8·3	+·2	0	9 30
Sept. 30	5293	...	$d-2\cdot0$	$e-1\cdot5$	$=f$	$g+1\cdot0$	$h+1\cdot3$	9·0	0	+·1	9 30
Oct. 14	5307	...	$e-2\cdot0$	$f-1\cdot3$	$g+0\cdot7$	$h+0\cdot7$	$m+1\cdot5$	9·5	+·1	0	8 0
Oct. 21	5314	...	$f-1\cdot0$	$g-0\cdot2$	$h+0\cdot4$	$l+1\cdot5$	$m+2\cdot0$	9·4	+·1	0	7 50
Nov. 10	5334	...	$f-1\cdot5$	$g-1\cdot0$	$h-0\cdot3$	$l+0\cdot3$	$m-0\cdot7$	10·6	−·2	0	9 50
Nov. 17	5341	...	$g-1\cdot5$	$h-1\cdot0$	$k-1\cdot0$	$l+0\cdot3$	$m+0\cdot3$	10·8	0	0	10 0
Nov. 30	5354	...	$f-1\cdot7$	$g-1\cdot3$	$h-0\cdot8$	$l-0\cdot5$	$=m$	10·8	−·2	0	6 40
Dec. 15	5369	...	$h-1\cdot7$	$k-1\cdot5$	$l-0\cdot5$	$m-0\cdot3$	$n-0\cdot2$	11·5	−·2	−·1	6 30
Dec. 28	5382	...	$f-2\cdot5$	$g-1\cdot8$	$h-1\cdot6$	$l-1\cdot0$	$m-1\cdot0$	11·5	−·2	0	7 [illegible]

U Orionis.

R. A. $5^h\ 49^m\ 53^s$. Dec. $+20°\ 9'{\cdot}4$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections. Scale.	Corrections. Stars.	Apparent Correction to Harvard.
1887 Jan. 25	0297	...	=2	3+0·2	...	...	...	8·2	+·2	0	...
Feb. 2	0305	...	2+0·2	3+0 5	...	...	...	7·9	+·3	0	...
Feb. 10	0313	...	=2	3+0·2	...	...	...	8·2	+·2	0	...
Feb. 26	0329	...	2−0·3	3+0·3	...	...	...	8·3	0	0	...
Mar. 18	0349	...	=3	...	...	...	...	8·6	0	0	...
Mar. 27	0358	...	3−0·5	...	...	...	...	8·9	−·3	0	...
Apr. 9	0371	...	=4	...	...	...	...	9·5	0	−·5	...
Apr. 23	0385	...	3−1·0	4−0·2	...	...	...	9·6	−·3	−·2	...
May 8	0400	...	3−1·5	4−1·0	...	...	...	10·3	−·2	−·2	...
Oct. 21	0566	...	4−1·0	11+0·5	...	...	...	10·5	0	−·4	...
Nov. 15	0591	...	2−1·5	3−0·3	4+0·8	5+0·8	6+1·0	8·9	+·1	−·1	...
Nov. 20	0596	...	{2−0·5 16−2·0}	3+0·5	4+1·5	5+1·5	6+1·5}	8·5	+·1	−·1	...
Nov. 29	0605	...	2−0·2	3+1·0	4+2·0	5+2·0	16−1 0	7·8	+·1	−·1	...
Dec. 10	0616	...	1−2·5	2+1·0	3+2 0	16−0·5	...	7·3	0	0	...
Dec. 22	0628	...	1−2·0	2+1·0	3+1·7	=16	...	7·1	+·1	0	...
Dec. 29	0635	...	1−2·5	2+0·5	3+1·5	14+1 0	16−0·3	7·5	+·1	0	...
1888 Jan. 17	0654	...	1−3·0	=2	3+0·8	16−1·5	...	8 1	−·1	0	...
Feb. 1	0669	...	1−2·0	4+2·0	=16	...	...	7·4	0	−·1	...
Feb. 12	0680	...	1−3·0	2−0·5	3+0·3	4+2·0	16−0·3	8 0	−·1	0	...
Feb. 14	0682	...	2+0·2	3+1·0	=14	16−0·3	...	7·8	+ 1	0	...
Mar. 2	0699	...	=2	4+1·0	3+0·8	5+1·5	16−1·5	8·2	+·1	−·1	...
Mar. 18	0715	...	=3	2−0 8	4+1·0	5+1·5	10+2 0	8·4	+·1	−·1	...
Apr. 8	0736	...	3−1·0	2−2·0	4+0·5	5+0·7	19+0·5	9·3	+·1	−·1	...
Apr. 25	0753	...	4−0·5	=5	17+0·5	=19	...	9 5	0	−·1	...
May 8	0766	...	2−2 0	3−1·0	4−0 6	5−0·3	11+1 5	9 8	−·2	−·1	...
Oct. 15	0926	80	4−0·5	5−0·5	=6	11+1·0	...	10·0	0	−·2	...
Oct. 30	0941	...	{2−2·0 10+1·0}	3−1·0	4−0·5	=5	7+1·0}	9·5	0	0	...
Nov. 20	0962	...	2−0·5	3+0·7	4+1·5	15+1·5	16−1·0	8·1	+·1	−·1	...
Nov. 30	0972	...	1−2·0	2+1·0	3+2·0	16+0 5	...	6·9	+·1	0	...
Dec. 9	0981	...	1−1·5	2+2 0	3+2·7	16+1·0	...	6·3	+·1	0	...
Dec. 14	0986	...	1−1·0	2+2·0	3+2·7	16+1·0	...	6·1	+·1	0	...
Dec. 24	0996	...	1−1·0	2+3·0	3+4·0	16+1·5	...	5·4	+·1	0	...
1889 Jan. 2	1005	...	1−1·0	2+3·0	3+3·7	16+1·5	...	5·5	+·2	0	...
Jan. 10	1013	...	1−1·0	2+3·0	3+4·0	16+2·0	...	5·3	+·2	0	...
Jan. 17	1020	...	1−2·0	2+2·0	3+3·0	16+1·0	...	6·3	+·2	0	...
Jan. 29	1032	...	1−2 0	2+2·0	3+2·7	16+1·0	...	6·4	+·2	0	...
Feb. 11	1045	...	2+1·5	3+2·0	4+3·0	5+3·5	=16	6·6	+·2	−·1	...

U Orionis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1889 Feb. 23	1057	...	2+1·0	3+1·7	5+2·0	16−0·3	...	7·2	+·2	0	...
Mar. 13	1075	...	2+0·3	3+1 3	5+2 0	6+2 7	16−1·3	7·7	+ 2	0	...
Mar. 25	1087	...	2−0·2	3+1 0	4+1·5	5+2·3	16−1 0	7·9	+·1	−·1	...
Apr. 18	1111	...	2−0 6	=3	4+1 0	5+1 5	16−2·0	8·6	0	−·1	...
Apr. 29	1122	...	2−1·3	3−0·5	4+0·5	5+1·0	6+2·0	8·8	+·1	−·1	...
May 10	1133	...	2−1·5	3−0·5	4+0·3	5+1 0	...	9·1	0	−·1	...
Nov. 12	1319	...	2−2·0	3−1·0	4−0·2	5+0·5	15−0·5	9·5	−·2	−·1	...
Nov. 22	1329	...	4+0·5	5−0·3	...	...	...	9·4	0	−·2	...
Dec. 3	1340	...	2−0·5	3+0·5	4+1·5	15+0·7	16−1·3	8·4	+·1	−·1	...
Dec. 10	1347	...	2+0·3	3+1·0	4+2·0	15+1·5	16−0·7	7·8	+·2	−·1	...
Dec. 20	1357	...	1−2·0	2+1·0	3+1·6	4+2·0	16+0·7	7·0	+·2	0	...
1890 Jan. 1	1369	...	1−1·5	2+1·5	3+2·3	5+3·0	16+1 0	6·5	+·2	0	...
Jan. 10	1378	...	1−1·0	2+1·5	3+2·0	4+2·3	16+0·5	6·7	+·2	0	...
Jan. 19	1387	...	2+1 0	3+2·0	5+2·5	6+3·0	16+0·5	6·9	+·3	0	...
Feb. 4	1403	...	1−1·5	2+1·5	3+2·0	4+2·3	16+1 0	6·6	+·2	0	...
Feb. 15	1414	...	1−2 0	2+0·4	3+1·2	4+2·0	=16	7·3	+·1	0	...
Feb. 23	1422	...	2+0 5	3+1 0	4+1·5	5+2·0	16−1·0	7·8	+·2	−·1	...
Mar. 16	1443	...	2−0·3	3+0 7	4+1 5	5+2·0	16−1·0	8·0	+·1	−·1	...
Mar. 29	1456	...	2 −1 2	3−0·5	4+1·0	6+2·0	16−1·5	8·8	−·1	−·2	...
Apr. 25	1483	...	2−1 0	3−0·5	4+0·2	5+0·5	6+1 0	9·1	+·1	−·1	...
May 7	1495	...	2−2·0	3−1 0	4−0·2	5+0·5	10+1·0	9·4	−·1	−·1	. .
Oct. 13	1654	80	4−1·0	=8	9−0 2	10−1 0	11−0·4	10·7	−·2	0	...
Oct. 20	1661	80	7−1·5	8−1·0	9−1·0	10−1·5	11−0·5	11·4	−·2	+·1	...
Nov. 3	1675	80	7−1·0	8−0·7	9−1·0	10−1·0	11−0·1	11·1	−·2	+·1	...
Nov. 13	1685	80	7−1·0	=8	9−0·5	10−1·0	11+0·5	10·7	−·1	+·1	...
Nov. 21	1693	...	4−1·2	5−0·5	=6	8+0 7	11+1 0	10·1	0	−·1	...
Dec. 19	1721	...	2−1·0	3+1·0	4+1·3	6+2·0	16−2·0	8·5	+·1	−·2	...
1891 Jan. 3	1736	...	1−2·0	2+1·0	3+2·0	4+2·5	16−0·5	7·1	+·1	0	...
Jan. 10	1743	...	2+1·2	3+2·0	4+2·6	16+0·6	...	6·8	+·3	−·1	...
Jan. 18	1751	...	2+1·0	3+2·0	4+2·5	5+3·0	16+0·5	6·8	+·3	−·1	...
Jan. 24	1757	...	1−2·0	2+1·5	3+2·5	6+3·0	16+1·0	6·7	+·2	0	...
Feb. 5	1769	...	2+1·0	3+2·0	4+3·0	5+3·0	6+4·0	6·5	+·3	−·1	...
Feb. 12	1776	...	2+1·0	3+2·0	4+2·5	5+2·5	=16	7·0	+·2	−·1	...
Feb. 18	1782	...	2+0·7	3+1·5	4+2·0	5+2·5	6+3·0	7·2	+·3	−·1	...
Feb. 25	1789	...	2+1 0	3+1·8	4+2·2	5+2·5	6+3·0	7·0	+·3	−·1	...
Mar. 4	1796	...	2+0 7	3+1·5	4+1 8	5+2·0	6+2·6	7·4	+·3	−·1	...
Mar. 19	1811	...	2+0·6	3+1·3	4+1·5	5+1·8	6+2·5	7·6	+·3	−·1	...
Apr. 5	1828	...	=2	3+1·0	4+1·3	5+1·5	6+2·5	7 8	+·2	−·1	...
Apr. 16	1839	...	2−0·7	3+0·5	4+1·0	5+1·3	6+2·0	8 3	+·2	−·1	...
May 11	1864	...	2−2·5	3−1·3	4−0·5	...	...	10·1	−·2	−·1	...
Oct. 10	2016	80	8−0·5	9−1 0	10−1·2	11−0·2	...	11·1	−·2	0	...

U ORIONIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	S ars.	
1891 Oct. 23	2029	...	4−1·7	=7	9+1·0	10+1 0	11+0 2	10·2	0	0	...
Oct. 31	2037	...	=7	8+0·5	=9	10−0·5	11+0·3	10·2	0	+·1	...
Nov. 23	2060	...	4−1·5	5−0·8	7−0·5	10−0·2	11+1·0	10 3	−·1	0	...
Dec. 7	2074	...	4−1 2	=5	6+0·5	7+1·0	10+0·7	9·6	+·1	0	...
Dec. 19	2086	...	2−1·7	3−1·0	4+0 7	5+1 5	10+1·5	8·9	+·1	−·1	...
Dec. 28	2095	...	2−0·7	3+0·3	4+1·3	16−1·3	...	8·5	0	−·1	...
1892 Jan. 24	2122	...	1−2 0	2+1·0	3+2·0	4+2·5	16+1·0	6·8	+·2	0	...
Feb. 3	2132	...	1−1·5	2+1·3	3+2·3	4+3·0	16+1·0	6·5	+·2	0	...
Feb. 12	2141	...	1−1·3	2+2·3	3+3 0	4+3·2	16+1·5	6·0	+·2	0	...
Feb. 16	2145	...	2+1·3	3+2 0	4+2·5	5+2·5	16+0·7	6·8	+·3	− 1	...
Feb. 23	2152	...	1−2 5	2+1·0	3+2 0	4+2·5	16+0·5	7·0	+·2	0	...
Mar. 1	2159	...	1−2 0	2+1·5	3+2·5	4+2 8	16+1·0	6 5	+·2	0	...
Mar. 10	2168	...	2+1·5	3+2·3	4+2·3	5+3·0	16+0·7	6·6	+·3	−·1	...
Mar. 22	2180	...	2+1·6	3+2·0	4+2·5	5+3·0	16+1·0	6 6	+·3	−·1	...
Mar. 28	2186	...	2+1·0	3+1 7	4+2·0	5+2·5	16−1 0	7·4	+·2	−·1	...
Apr. 7	2196	...	2+0·5	3+1·3	4+2·0	11+3·0	16−1·0	7·7	+·2	−·2	...
Apr. 25	2214	...	2−0·4	3+0·6	4+1·0	5+1·5	16−1·3	8·3	+·1	−·1	...
Oct. 19	2391	80	7−0·7	8−0·7	9−0·7	10−1·5	11−0·5	11·1	− 2	+·1	...
Nov. 9	2412	...	=7	8+0·5	=9	10−0 5	11−1·0	10·5	0	+·1	...
Nov. 19	2422	...	7−0·3	8+0 5	9−0·3	10−1·5	11−0·3	10·7	−·1	+·1	...
Nov. 26	2429	...	7+0·5	8+1 0	9+1·0	10−1 0	11+0·2	10·0	+·2	+·1	...
Dec. 5	2438	...	3−2·0	4−2·0	5−1·0	=6	10−0·3	10·7	−·2	−·1	...
Dec. 13	2446	...	7+0·5	8+0·5	9+0·5	10−0·5	11+0·6	10·0	+·1	+·1	...
Dec. 27	2460	...	4−1 0	5−0·3	6+0 3	8+2·0	10+1·0	9·6	+·1	0	...
1893 Jan. 10	2474	...	2−0·3	3+0·7	4+1·3	5+1·3	16−1·5	8 3	0	−·1	...
Jan. 20	2484	...	2+0·5	3+1·3	4+1 5	6+2·0	=16	7 7	+·2	−·2	...
Feb. 7	2502	...	1−1·5	2+0 7	3+1·3	4+1·5	16−0·3	7·4	0	0	...
Feb. 14	2509	...	1−2·0	2+0·8	3+1·5	4+1·5	16+0 3	7 3	+·1	0	...
Feb. 26	2521	...	1−2·5	2+1·0	3+1·7	16−0·5	..	7·4	0	0	...
Mar. 7	2530	...	2+0·8	3+1·3	4+1·3	6+2·0	16−0·3	7·8	+·1	−·2	...
Mar. 15	2538	...	2+0·7	3+1 2	4+1·5	6+2·0	16−0·5	7·8	+·1	−·2	...
Mar. 23	2546	...	2+0·7	3+1·2	6+1·5	11+2·0	16−0·7	8·1	+·1	−·1	...
Apr. 5	2559	...	2−0·7	3+0·3	4+1·2	5+1·2	16−1·3	8·5	0	−·1	...
Apr. 9	2563	...	2+0·5	3−0·5	4+1·0	5+1·3	16−1·0	8·3	0	−·1	...
Apr. 25	2579	...	2−0·7	3+0·3	4+1·0	6+1·5	16−1·3	8·6	0	−·2	...
May 9	2593	...	2−1·5	3−0·3	4+0·3	5+1·0	6+1·5	8·9	0	−·1	...
Oct. 31	2768	80	7−1·5	8−1·0	10−1·5	11−1·0	...	11·5	−·1	+·1	...
Nov. 12	2780	...	7−0·5	=8	9−0·5	10−1·2	11−0·5	10·8	−·1	+·1	...
Dec. 2	2800	...	4−1·2	7+1·0	8+1·0	10−0·6	11+1·0	10·0	0	0	...
Dec. 14	2812	...	4−1·5	7+0·7	9+0·7	10−0·2	11+1·5	9·9	0	0	...
Dec. 21	2819	...	2−2·0	3−1·3	4−1·0	7+1·0	10+0·3	9·8	0	0	...
1894 Jan. 2	2831	...	1−2·5	2−1·3	3−0·7	4+0·5	16−1·5	8·8	0	0	...
Jan. 23	2852	...	1−2·0	2+0·5	3+1·2	4+1·2	16−0·3	7·6	0	0	...

U Orionis—*continued.*

Date.	Julian Day.	Power	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1894 Jan. 28	2857	...	1−1·5	2+1·5	3+2·0	4+2·3	16+1·0	6·6	+·1	0	...
Feb. 3	2863	...	1−1·5	2+1·0	3+1·5	4+1·5	16−0·5	7·3	0	0	...
Feb. 8	2868	...	1−1·5	2+1·3	3+1·7	4+2·0	16+1·0	6·9	+·1	0	...
Feb. 18	2878	...	1−1·5	2+1·3	3+2·0	4+1·7	16+1·0	6·8	+·1	0	...
Feb. 24	2884	...	1−1·5	2+1·2	3+1·7	4+1·7	=16	7·1	+·1	0	...
Mar. 6	2894	...	1−1·8	2+1·0	3+1·5	4+1·5	16+0·5	7·2	+·1	0	...
Mar. 15	2903	...	1−2·0	2+1·0	3+1·5	4+2·0	16−0·5	7·3	0	0	...
Mar. 22	2910	...	1−1·5	2+1·0	3+1·5	4+1·5	16+0·5	7·1	+·1	0	...
Apr. 2	2921	...	1−2·0	2+1·0	3+1·3	4+1·3	=16	7·4	+·1	0	...
Apr. 19	2938	...	1−2·0	2+1·0	3+1·4	11+2·0	16−0·7	7·8	0	0	...
Apr. 28	2947	...	2−0·5	3+0·4	4+1·2	10+2·0	16−1·0	8·3	0	−·1	...
May 4	2953	...	2−0·3	3+1·0	4+1·0	10+1·3	16−1·3	8·4	0	−·1	...
Nov. 5	3138	...	4−1·3	=7	8+0·5	10−0·7	11+0·5	10·4	0	0	...
Nov. 25	3158	...	7−0·5	=8	9−0·5	10−1·0	11−0·4	10·8	−·1	+·1	...
Dec. 4	3167	...	4−1·8	7+0·3	8+1·0	10−0·7	11+0·3	10·4	0	0	...
Dec. 19	3182	...	2−2·3	3−1·6	4−1·3	=10	11+1·0	10·2	0	−·2	...
Dec. 31	3194	...	2−2·0	3−1·0	4−0·5	10+0·3	11+1·3	9·8	0	−·2	...
1895 Jan. 8	3202	...	2−2·0	3−1·0	4−0·5	10+0·7	11+1·7	9·6	0	−·2	...
Jan. 23	3217	...	2−1·2	3−0·3	4+1·0	10+1·3	11+2·3	8·8	0	−·2	...
Feb. 5	3230	...	1−2·0	2+0·7	3+1·3	10+2·0	16−0·5	7·6	0	0	...
Feb. 17	3242	...	1−2·0	2+1·0	3+1·6	4+1·6	=16	7·3	+·1	0	...
Mar. 4	3257	...	1−1·3	2+1·0	3+1·8	4+2·0	16+1·0	6·8	+·1	0	...
Mar. 13	3266	...	1−1·5	2+1·0	3+1·5	4+2·0	16+0·5	7·0	+·1	0	...
Mar. 25	3278	...	1−2·0	2+1·0	3+1·5	4+1·5	16+1·0	7·1	+·1	0	...
Apr. 7	3291	...	2+0·3	3+1·0	4+1·3	11+2·3	16−0·7	8·1	+·1	−·2	...
Apr. 13	3297	...	2+0·5	3+1·2	4+1·2	10+1·8	16−1·0	8·0	+·1	−·1	...
May 1	3315	..	2−1·0	3−0·3	10+1·5	11+2·0	16−1·3	8·8	0	−·1	...
May 10	3324	...	2−0·9	3+0·5	4+0·8	11+2·0	16−1·3	8·6	0	−·2	...
Oct. 25	3492	80	7−2·0	8−1·5	9−1·5	10−2·0	11−1·3	12·0	−·1	+·1	...
Nov. 14	3512	...	7−0·7	8−0·7	9−0·7	10−1·5	11−0·5	11·1	−·1	+·1	...
Dec. 7	3535	...	4−1·6	7+0·3	8+1·0	10−0·5	=11	10·6	0	0	...
Dec. 31	3559	...	2−1·5	3−1·0	4−0·5	10+0·5	...	9·6	−·1	−·1	...
1896 Jan. 19	3578	...	2−1·3	3−0·6	4−0·2	10+1·0	11+1·6	9·3	0	−·2	...
Jan. 30	3589	...	2−1·2	3−0·6	4+0·5	10+1·0	11+1·5	9·2	0	−·2	...
Feb. 17	3607	...	1−2·0	2+0·7	3+1·0	10+2·0	16−0·7	7·7	0	0	...
Feb. 26	3616	...	1−1·3	2+1·3	3+1·6	10+2·0	16+0·5	7·1	+·1	0	...
Mar. 4	3623	...	2+1·3	3+1·5	4+1·5	10+1·8	16+0·5	7·4	+·2	−·1	...
Mar. 14	3633	...	2+1·0	3+1·3	4+1·3	10+2·0	=16	7·6	+·2	−·1	...
Mar. 18	3637	...	1−1·3	2+1·0	3+1·6	4+2·0	16+0·5	6·9	+·1	0	...
Mar. 27	3646	...	1−1·5	2+1·3	3+1·7	4+1·5	16+0·7	7·0	+·1	0	...
Apr. 8	3658	..	2+0·5	3+1·0	4+1·5	10+2·3	16−0·5	7·7	+·1	−·1	...
Apr. 17	3667	...	2+0·5	3+1·0	4+1·2	10+2·0	16−0·5	7·9	+·1	−·1	...
Apr. 26	3676	...	2+0·8	3+1·3	4+1·0	10+1·8	16−0·5	7·8	+·1	−·1	...

U Orionis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1896 May 6	3686	...	1−2·0	2+0·6	3+1·3	4+1·5	16−0·5	7·5	0	0	...
May 14	3694	...	2+0·3	3+1·0	4+1·5	16−0·7	...	7·9	+·1	−·1	...
May 20	3700	...	=2	3+0·5	16−1·0	...	...	8·2	0	0	...
Oct. 18	3851	...	4−2·0	=7	=9	10−0·7	11−0·5	10·7	−·1	0	...
Oct. 27	3860	...	7−0·5	=8	=9	10−0·7	11−0·5	10·6	−·1	+·1	...
Nov. 2	3866	...	7−0·6	=8	9−0·3	10−0·6	11−0·3	10·7	−·1	+·1	...
Nov. 10	3874	80	7−0·5	=8	9−0·5	10−1·0	11+0·3	10·6	0	+·1	...
Nov. 20	3884	...	4−1·3	=7	9+0·3	10−0·3	11+0·7	10·2	0	0	...
Nov. 29	3893	...	4−1·3	7+0·3	8+0·3	10−0·3	11+0·2	10·4	0	0	...
Dec. 11	3905	...	4−1·2	7+1·0	9+1·0	10+0·2	11+1·0	9·7	0	0	...
1897 Jan. 17	3942	...	2−1·7	3−1·0	4−0·6	10+0·7	11+1·0	9·7	0	−·2	...
Feb. 3	3959	...	2−1·3	3−0·5	4+0·5	10+1·3	...	9·0	0	−·1	...
Feb. 15	3971	...	1−2·5	2+0·3	3+1·0	4+1·0	16−0·3	7·8	0	0	...
Mar. 3	3987	...	1−1·3	2+1·5	3+2·0	4+1·7	16+1·0	6·7	+·1	0	...
Mar. 13	3997	...	1−1·4	2+1·5	3+2·0	4+1·7	16+1·0	6·7	+·1	0	...
Mar. 19	4003	...	1−1·3	2+1·5	3+1·7	4+2·3	16+1·0	6·7	+·1	0	...
Mar. 28	4012	...	1−1·2	2+1·4	3+1·8	4+2·0	16+1·2	6·7	+·1	0	...
Apr. 7	4022	...	1−1·3	2+1·0	3+1·5	4+2·0	16+1·0	6·9	+·1	0	...
Apr. 22	4037	...	1−2·0	2+1·0	3+1·5	4+1·5	16−0·5	7·4	0	0	...
Apr. 30	4045	...	2+0·8	3+1·3	4+1·5	10+2·0	16−0·7	7·7	+·1	−·1	...
May 7	4052	...	2+0·8	3+1·3	4+1·0	10+2·0	16−0·5	7·8	+·1	−·1	...
Oct. 20	4218	80	7−1·0	=8	9−1·0	10−2·0	11−1·0	11·3	−·1	+·1	...
Oct. 28	4226	80	7−1·0	=8	9−0·5	10−2·0	11−2·0	11·4	−·1	+·1	...
Nov. 6	4235	80	7−0·5	=8	9−0·5	10−2·0	11−1·5	11·2	−·1	+·1	...
Nov. 18	4247	80	4−1·0	7−1·3	8−0·6	9−1·3	10−1·3	11·1	−·1	+·1	...
Nov. 29	4258	...	4−2·0 =11	=7	8+0·5	=9	10−1·0	10·6	0	0	...
Dec. 6	4265	...	4−1·7	7+0·5	9+0·5	10−0·5	11+0·5	10·2	0	0	...
Dec. 22	4281	...	2−3·0	3−2·0	4−1·5	10−0·5	11+0·5	10·7	−·1	−·2	...
1898 Jan. 7	4297	...	2−2·3	3−1·5	4−1·0	10−0·2	11+1·3	10·1	−·1	−·2	...
Jan. 22	4312	...	2−2·0	3−1·3	4−0·6	10+1·0	11+1·0	9·8	−·1	−·2	...
Feb. 8	4329	...	2−1·2	=3	4+1·0	10+1·5	11+2·0	8·8	+·1	−·2	...
Feb. 23	4344	...	1−2·5	2−0·2	3+1·0	4+1·5	16−1·0	7·9	−·1	0	...
Mar. 7	4356	...	1−2·0	2+1·3	3+1·8	4+2·0	16+0·8	6·9	+·2	0	...
Mar. 12	4361	...	1−1·5	2+2·0	3+2·5	4+2·2	16+1·0	6·5	+·2	0	...
Mar. 20	4369	...	1−3·0	2+2·0	3+2·7	4+3·0	16+1·0	6·6	+·2	0	...
Mar. 29	4378	...	1−1·5	2+2·0	3+2·7	4+3·0	16+1·0	6·3	+·2	0	...
Apr. 5	4385	...	2+2·0	3+3·0	4+3·0	10+3·5	16+1·0	6·2	+·3	−·1	...
Apr. 15	4395	...	2+1·0	3+2·0	4+2·0	11+3·0	16+0·3	7·2	+·3	−·1	...
Apr. 22	4402	...	2+1·5	3+2·0	4+3·0	11+3·5	16+1·0	6·7	+·3	−·1	...
May 4	4414	...	2+1·5	3+2·5	4+3·0	16+0·8	...	6·4	+·3	−·1	...

U Orionis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections. Scale.	Corrections. Stars.	Apparent Correction to Harvard.
1898 Oct. 19	4582	80	$m-2\cdot5$	$q-1\cdot0$	...	...	...	11·3	−·2	...	...
Nov. 5	4599	...	$m-2\cdot5$	$p-1\cdot3$	$q-1\cdot0$	1·0	$w+1\cdot0$	11·4	−·1	...	...
Nov. 18	4612	80	$k-4\cdot0$	$l-3\cdot0$	$m-3\cdot0$	1·0	$t-1\cdot0$	11·5	−·2	...	...
Dec. 7	4631	80	$m-2\cdot3$	$q-1\cdot0$	$r-0\cdot3$	t	$u+1\cdot0$	10·6	−·1	...	...
Dec. 15	4639	80	$k-3\cdot0$	$l-2\cdot0$	$m-2\cdot3$	1·0	$q-0\cdot5$	10·8	−·2	...	...
Dec. 22	4646	...	$d-4\cdot0$	$k-3\cdot0$	$l-2\cdot3$	2·0	$=q$	10·5	−·2	...	...
Dec. 28	4652	...	$k-3\cdot0$	$l-2\cdot0$	$m-1\cdot3$	0 5	...	10·3	−·1	...	...
1899 Jan. 23	4678	...	$d-4\cdot0$	$f-3\cdot0$	$k-2\cdot5$	2·0	$m-1\cdot3$	10·1	−·2	...	...
Feb. 1	4687	...	$k-3\cdot0$	$l-2\cdot0$	$m-1\cdot0$	·0·3	$q+0\cdot3$	10·2	−·1	...	...
Feb. 21	4707	...	$d-2\cdot0$	$f-1\cdot3$	$=k$	·1·0	$m+1\cdot3$	7·7	0	...	...
Feb. 25	4711	...	$d-2\cdot0$	$f-1\cdot3$	$k-0\cdot3$	·0 5	$m+1\cdot7$	7·8	−·1	...	...
Mar. 4	4718	...	$d-2\cdot0$	$f-1\cdot0$	$k+0\cdot7$	·1·2	$m+1\cdot7$	7·4	+·1	...	...
Mar. 14	4728	...	$d-1\cdot0$	$f+1\cdot0$	$k+1\cdot0$	·2·0	$m+2\cdot5$	6·4	+·2	...	...
Mar. 20	4734	...	$a-2\cdot0$	$d-1\cdot0$	$f+1\cdot0$	·1·0	$l+1\cdot4$	6·5	+·1	...	...
Apr. 8	4753	...	$a-2\cdot0$	$d-1\cdot0$	$f-1\cdot3$	·1·6	$l+2\cdot0$	6·9	−·1	...	...
Apr. 15	4760	...	$d-0\cdot6$	$f+1\cdot0$	$k+2\cdot0$	·2·0	$m+3\cdot0$	6·0	+·2	...	...
Apr. 26	4771	...	$d-1\cdot5$	$f+0\cdot5$	$k+1\cdot3$	·1·6	$m+2\cdot3$	6·7	+·2	...	...
May 3	4778	...	$d-1\cdot5$	$f+1\cdot0$	$k+1\cdot0$	·2·0	$m+3\cdot0$	6·0	+·2	...	...
Oct. 12	4940	...	$k-3\cdot0$	$l-2\cdot5$	$m-2\cdot0$						
Oct. 28	4956	132	$l-4\cdot0$	$m-3\cdot0$	$p-2\cdot0$	-1·0	$=q$	7 3	−·2	...	...
Nov. 6	4965	132	$k-3\cdot0$	$l-3\cdot0$	$m-3\cdot0$	·1·0	...	6·7	−·3	...	...
Nov. 26	4985	132	$k-4\cdot0$	$l-3\cdot0$	$m-3\cdot5$	−2·0	$q-1\cdot0$	6·6	−·3	...	...
Dec. 6	4995	80	$k-4\cdot0$	$l-3\cdot0$	$m-3\cdot0$	−2·0	$q-1\cdot5$	6·2	−·3	...	...
Dec. 25	5014	...	$k-2\cdot3$	$l-2\cdot3$	$m-1\cdot7$	−2·0	$q-1\cdot3$	6 3	−·3	...	...
1900 Jan. 5	5025	...	$k-2\cdot5$	$l-1\cdot5$	$m-1\cdot5$	−1·0	$q-0\cdot2$	7·5	−·3	...	...
Jan. 16	5036	...	$k-2\cdot0$	$l-1\cdot5$	$m-1\cdot2$	−0·5	$q+0\cdot5$	10·1	−·1	...	...
Jan. 30	5050	...	$k-2\cdot3$	$l-1\cdot7$	$m-1\cdot0$	$=p$	$q+1\cdot0$	9·7	−·1	...	...
Feb. 6	5057	...	$k-2\cdot0$	$l-1\cdot3$	$m-1\cdot2$	$=p$	$q+1\cdot2$	9·8	−·1	...	...
Feb. 17	5068	...	$k-2\cdot0$	$l-1\cdot5$	$m-0\cdot5$	+0·5	$q+1\cdot5$	9·5	−·1	...	...
Mar. 4	5083	...	$d-2\cdot0$	$f-1\cdot0$	$=k$	·+0·3	$q-1\cdot0$	9·5	−·1	...	...
Mar. 12	5091	...	$d-1\cdot3$	$f-0\cdot5$	$k+1\cdot0$	+1·0	$m+1\cdot5$	7·6	0	...	G.M.T. h m
Mar. 17	5096	...	$d-1\cdot0$	$f-0\cdot5$	$k+1\cdot0$	+1·3	$m+1\cdot5$	7·1	+·1	...	7 10
Mar. 26	5105	...	$d-1\cdot2$	$f+0\cdot8$	$k+2\cdot0$	l 1·0	$m+1\cdot5$	7·1	+·1	...	8 40
Apr. 4	5114	...	$d-1\cdot2$	$f+1\cdot0$	$k+1\cdot5$	$l+$ 1·5	$m+3\cdot0$	6·1	+·2	...	7 50
Apr. 13	5123	...	$a-1\cdot5$	$d-1\cdot0$	$f+1\cdot5$	$k+1$ 0	$m+2\cdot5$	6·3	+·2	...	9 20
Apr. 19	5129	...	$d-1\cdot2$	$f+1\cdot0$	$k+1\cdot5$	$l+2\cdot0$	$l+2\cdot0$	6·1			
Apr. 26	5136	...	$d-1\cdot5$	$f+0\cdot5$	$k+1\cdot3$	$l+2\cdot0$	m		+·2	...	9 30
						$l+1\cdot8$	... 2 3	6·6	+·2	...	8 40
Oct. 14	5307	...	$l-3\cdot0$	$m-2\cdot0$	$q-0\cdot7$	...	...	11·0	−·2	...	10 0
Oct. 26	5319	...	$l-3\cdot0$	$m-2\cdot3$	$p-1\cdot5$	$q-0$ 7	...	11·1	−·2	...	10 0
Nov. 15	5339	80	$k-3\cdot5$	$l-3\cdot0$	$m-2\cdot5$	$p-1\cdot5$	$q-1\cdot0$	11·3	−·2	...	10 0
Nov. 22	5346	80	$l-3\cdot5$	$m-2\cdot5$	$p-1\cdot5$	$q-1\cdot0$	...	11·3	−·2	...	10 0
Dec. 10	5364	132	$l-3\cdot5$	$m-3\cdot0$	$p-1\cdot7$	$q-1\cdot0$	...	11·5	−·2	...	8 50
Dec. 19	5373	80	$l-3\cdot5$	$m-2\cdot8$	$p-1\cdot8$	$q-0\cdot7$	...	11·4	−·2	...	7 40
Dec. 28	5382	...	$k-3\cdot0$	$l-2\cdot5$	$m-2\cdot0$	$p-1\cdot0$	$q-0\cdot5$	11·3	−·2	...	7 10

Errata

Errata in Vol. LV., Memoirs, R.A.S.

R Lyncis.

R. A. $6^h\ 53^m\ 3^s$. Dec. $+55°\ 28'.3$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1892 Apr. 23	2212	...	$a-1.5$	$e+1.5$	$f+1.5$	$g+2.0$	$h+2.0$	7·6	+·1	+·1	− ·3
May 18	2237	...	$a-1.0$	$e+1.5$	$f+1.3$	$g+2.0$	$h+2.0$	7·5	+·1	+·1	+ ·3
June 8	2258	...	$a-1.0$	$e+1.0$	$f+1.0$	$g+2.0$	$h+2.0$	7·7	+·1	+·1	+ ·5
June 15	2265	...	$a-1.0$	$e+1.0$	$f+1.0$	$g+2.0$	$h+2.0$	7·7	+·1	+·1	+ ·3
July 4	2284	...	$a-1.5$	$e+1.0$	$f+1.0$	$g+2.0$	$h+2.0$	7·8	+·1	+·1	− ·3
July 23	2303	...	$a-1.5$	$=e$	$f+0.5$	$g+1.0$	$h+1.5$	8·4	+·1	+·1	− ·4
Aug. 10	2321	...	$a-2.0$	$f-0.5$	$h+1.0$	$k+1.0$	$m+1.5$	9·0	0	0	− ·6
Aug. 21	2332	...	$a-2.5$	$f-0.3$	$h+0.5$	$k+1.0$	$m+2.0$	9·1	0	0	− ·9
Sept. 7	2349	...	$f-1.5$	$g-0.5$	$h-0.5$	$=k$	$m+1.0$	10·1	0	0	− ·5
Sept. 17	2359	...	$f-2.0$	$h-1.0$	$k-1.0$	$m-0.5$	$n+1.0$	10·8	−·1	0	− ·3
Oct. 5	2377	...	$f-1.5$	$h-1.0$	$=k$	$m+1.5$	...	10·2	0	0	−1·6
Oct. 17	2389	80	$f-1.5$	$=h$	$k-0.5$	$l+1.0$	$=m$	10·2	0	+·1	−1·9
Oct. 31	2403	...	$f-1.0$	$g-0.5$	$=h$	$k-0.5$	$m+0.5$	10·1	0	0	−2·5
Nov. 10	2413	...	$f-1.3$	$g-0.6$	$=h$	$k+0.3$	$m+0.6$	10·0	0	0	−3·0
Dec. 6	2439	...	$f-1.5$	$g-0.8$	$h-0.5$	$=k$	$m+1.0$	10·2	0	0	−3·2
Dec. 27	2460	...	$f-1.0$	$=h$	$k+0.7$	$l+2.0$	$m+1.0$	9·5	+·1	+·1	−3·9
1893 Jan. 10	2474	...	$f-1.3$	$g-1.0$	$h-0.3$	$=k$	$m+0.6$	10·2	0	0	−3·4
Jan. 20	2484	...	$g-1.0$	$h-0.5$	$k-0.5$	$l+1.3$	$=m$	10·2	0	+·1	−3·3
Feb. 7	2502	...	$\left\{\begin{matrix} e-1.0 \\ m+0.5 \end{matrix}\right.$	$f-1.0$	$g-0.5$	$h-0.3$	$k+0.5\ \}$	9·9	−·1	0	−3·5
Mar. 1	2524	...	$g-2.5$	$h-2.0$	$k-2.0$	$l-0.5$	$m-1.0$	11·8	−·1	+·1	+ ·5
Mar. 8	2531	...	$g-2.0$	$h-1.3$	$k-1.0$	$=l$	$m-0.5$	11·0	−·1	+·1	+ ·2
Mar. 18	2541	...	$f-1.0$	$g-0.6$	$h-0.2$	$k-0.2$	$m+1.0$	10·0	−·1	0	+ ·2
Apr. 5	2559	...	$\left\{\begin{matrix} e-1.0 \\ m+1.0 \end{matrix}\right.$	$f-1.3$	$g-0.4$	$=h$	$k-0.5\ \}$	10·0	−·1	0	+ ·6
Apr. 23	2577	...	$a-2.0$	$f-0.3$	$h+1.0$	$k+1.5$	$m+2.2$	8·7	0	0	− ·1
May 8	2592	...	$a-2.5$	$e+0.5$	$f+0.7$	$g+1.3$	$h+1.5$	8·4	+·1	+·1	+ ·2
May 25	2609	...	$a-1.5$	$e+1.0$	$f+1.3$	$g+2.0$	$h+1.8$	7·8	+·1	+·1	− ·2
June 8	2623	...	$a-1.5$	$=d$	$e+1.0$	$f+1.3$	$h+2.3$	8·1	+·1	+·1	(+ ·1)
June 29	2644	...	$a-1.3$	$e+0.8$	$f+0.8$	$g+1.5$	$h+1.5$	8·0	+·1	+·1	(− ·1)
July 28	2673	...	$e-0.6$	$=f$	$g+1.3$	$k+1.5$	$m+2.5$	8·7	+·1	0	(− ·2)
Aug. 17	2693	...	$f-0.3$	$g+0.3$	$h+1.5$	$k+1.0$	$m+1.5$	9·0	+·1	0	(− ·5)
Aug. 30	2706	...	$f-1.5$	$g-1.0$	$=h$	$k-0.3$	$m+1.0$	10·2	0	0	(+ ·1)
Sept. 7	2714	...	$f-1.7$	$g-1.0$	$h-0.7$	$k+0.3$	$m+1.0$	10·2	0	0	− ·1
Sept. 23	2730	...	$f-2.5$	$h-1.0$	$k-1.5$	$l+1.0$	$=m$	10·8	0	+·1	0
Oct. 9	2746	...	$g-2.0$	$h-1.5$	$k-1.3$	$l-0.5$	$m-1.3$	11·3	−·1	+·1	− ·1
Oct. 19	2756	132	$h-2.0$	$k-2.0$	$l-0.5$	$m-2.0$	...	11·8	−·1	+·1	+ ·2
Oct. 31	2768	80	$k-2.0$	$l-0.5$	$m-1.2$	$n-0.3$	...	11·6	−·1	+·1	− ·4
Nov. 9	2777	80	$k-3.0$	$l-2.0$	$m-2.5$	$n-1.0$	...	12·7	−·1	+·1	+ ·6
Dec. 2	2800	132	$k-3.0$	$l-2.0$	$m-2.5$	$n-1.0$	...	12·7	−·1	+·1	+ ·1
Dec. 14	2812	132	$l-2.0$	$n-1.5$	...	...	...	12·5	−·1	+·4	(0)

From 1892 October 5 to 1893 February 7 apparently the wrong star was observed.

R LYNCIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1894 Feb. 3	2863	80	$l-2\cdot3$	$n-1\cdot5$	...	...	...	12·7	−·1	+·4	(+ ·9)
Feb. 21	2881	80	$h-2\cdot5$	$k-2\cdot0$	$l-1\cdot0$	$m-1\cdot5$	$n-1\cdot0$	11·0	−·1	+·1	− ·4
Mar. 6	2894	...	$f-2\cdot5$	$h-1\cdot3$	$k-0\cdot7$	$l+0\cdot5$	$m+0\cdot3$	10·7	0	0	− ·3
Mar. 22	2910	...	$f-1\cdot0$	$g-0\cdot3$	$=h$	$k+0\cdot5$	$m+1\cdot0$	9·8	0	0	− ·6
Apr. 12	2931	...	$e-1\cdot0$	$f-1\cdot0$	$=g$	$h+0\cdot5$	$k+1\cdot0$	9·5	0	0	− ·4
Apr. 19	2938	...	$f-0\cdot2$	$g+0\cdot2$	$h+1\cdot0$	$k+1\cdot3$	$m+1\cdot6$	9·0	+·1	0	− ·5
May 3	2952	...	$a-2\cdot0$	$f-0\cdot2$	$h+1\cdot0$	$k+1\cdot3$	$m+1\cdot6$	8·9	0	0	− ·4
May 20	2969	...	$a-1\cdot5$	$=e$	$f+0\cdot5$	$g+1\cdot0$	$h+1\cdot0$	8·5	+·1	+·1	− ·2
June 9	2989	...	$a-1\cdot3$	$e+1\cdot0$	$f+1\cdot3$	$g+1\cdot3$	$h+1\cdot6$	7·9	+·1	+·1	− ·4
June 20	3000	...	$a-1\cdot2$	$e+1\cdot5$	$f+1\cdot0$	$g+2\cdot0$	$h+2\cdot0$	7·6	+·1	+·1	− ·6
July 4	3014	...	$a-1\cdot0$	$e+1\cdot0$	$f+1\cdot3$	$g+1\cdot5$	$h+2\cdot0$	7·7	+·1	+·1	− ·4
July 21	3031	...	$a-1\cdot5$	$e+1\cdot0$	$f+0\cdot7$	$g+1\cdot3$	$h+1\cdot3$	8·1	+·1	+·1	− ·1
Aug. 16	3057	...	$e-0\cdot5$	$f-0\cdot5$	$=g$	$h+0\cdot5$	$k+1\cdot0$	9·3	0	0	− ·2
Aug. 30	3071	...	$f-1\cdot0$	$h+0\cdot5$	$k+0\cdot5$	$l+1\cdot0$	$m+1\cdot0$	9·6	+·1	0	− ·3
Sept. 14	3086	...	$a-1\cdot7$	$f-1\cdot0$	$=h$	$=k$	$m+1\cdot0$	9·5	0	0	− ·9
Oct. 2	3104	80	$f-2\cdot0$	$h-1\cdot3$	$k-1\cdot0$	$=l$	$m-1\cdot0$	11·1	−·1	0	0
Oct. 25	3127	132	$k-2\cdot5$	$l-1\cdot0$	$m-1\cdot3$	$n-0\cdot5$	...	11·9	−·1	+·1	+ ·1
Nov. 16	3149	132	$l-1\cdot5$	$m-2\cdot5$	$n-1\cdot0$	...	...	12·5	−·1	+·2	+ ·4
Nov. 30	3163	132	$l-2\cdot0$	$n-1\cdot3$	...	...	...	12·4	0	+·4	+ ·3
Dec. 15	3178	80	$k-3\cdot5$	$l-2\cdot0$	$m-3\cdot0$	$n-1\cdot0$	...	13·0	−·1	+·1	+ ·3
Dec. 27	3190	80	$k-2\cdot5$	$l-1\cdot3$	$m-2\cdot5$	$n-1\cdot0$	...	12·4	−·1	+·1	− ·3
1895 Jan. 17	3211	80	$k-3\cdot0$	$l-2\cdot0$	$m-2\cdot0$	$n-1\cdot0$	...	12·6	−·1	+·1	+ ·3
Jan. 28	3222	80	$k-2\cdot5$	$l-2\cdot0$	$m-2\cdot0$	$n-1\cdot0$	...	12·5	−·1	+·1	+ ·5
Feb. 12	3237	132	$k-3\cdot0$	$l-2\cdot0$	$m-2\cdot0$	$n-1\cdot0$	...	12·6	−·1	+·1	+1·2
Mar. 13	3266	...	$a-2\cdot0$	$f-1\cdot0$	$h-0\cdot3$	$k+0\cdot3$	$m+1\cdot0$	9·6	0	0	− ·9
Mar. 21	3274	...	$e-1\cdot0$	$=f$	$h-1\cdot0$	$=k$	$m+1\cdot0$	9·8	0	0	− ·5
Apr. 7	3291	...	$f-0\cdot2$	$g+0\cdot8$	$h+0\cdot6$	$k+1\cdot0$	$m+2\cdot0$	9·0	+·1	0	− ·5
Apr. 13	3297	...	$=f$	$g+1\cdot0$	$h+0\cdot8$	$k+0\cdot8$	$m+1\cdot3$	9·0	+·2	0	− ·2
May 2	3316	...	$a-2\cdot3$	$e-0\cdot5$	$=f$	$g+0\cdot5$	$h+1\cdot0$	9·0	0	+·1	+ ·3
May 10	3324	...	$a-1\cdot5$	$e-0\cdot2$	$f+0\cdot7$	$g+1\cdot0$	$h+1\cdot3$	8·4	0	+·1	− ·1
May 29	3343	...	$a-1\cdot3$	$f+0\cdot8$	$h+1\cdot3$	$k+1\cdot5$	$m+2\cdot0$	8·3	+·1	0	− ·1
June 24	3369	...	$a-1\cdot5$	$e+1\cdot0$	$f+1\cdot0$	$g+2\cdot0$	$h+2\cdot0$	7·8	+·1	+·1	− ·4
July 7	3382	...	$a-1\cdot3$	$e+1\cdot0$	$f+1\cdot0$	$g+2\cdot0$	$h+2\cdot0$	7·8	+·1	+·1	− ·9
Aug. 3	3409	...	$a-1\cdot5$	$e+0\cdot2$	$f+0\cdot3$	$g+1\cdot0$	$h+1\cdot2$	8·5	+·1	+·1	(−1·5)
Aug. 17	3423	...	$f+0\cdot2$	$=g$	$h-0\cdot4$	$k+1\cdot0$	$m+1\cdot0$	9·4	+·1	0	(−1·2)
Sept. 7	3444	...	$f-1\cdot0$	$g+0\cdot3$	$=h$	$k+1\cdot0$	$m+1\cdot3$	9·5	+·1	0	(−2·0)
Sept. 21	3458	...	$f-1\cdot2$	$h-0\cdot8$	$k-0\cdot8$	$m+0\cdot2$	$n+1\cdot0$	10·4	0	0	(−1·7)
Oct. 4	3471	...	$f-2\cdot0$	$h-1\cdot0$	$k-0\cdot5$	$l+1\cdot0$	$m+0\cdot2$	10·5	0	0	(−1·9)
Oct. 19	3486	...	$f-2\cdot0$	$h-1\cdot0$	$k-1\cdot0$	$=l$	$m-0\cdot6$	10·9	−·1	0	(−1·9)
Oct. 29	3496	132	$h-2\cdot5$	$k-2\cdot0$	$l-1\cdot0$	$m-2\cdot0$	...	12·1	−·1	+·1	(− ·7)
Nov. 14	3512	132	$h-2\cdot5$	$k-2\cdot5$	$l-1\cdot0$	$m-1\cdot5$	$o-0\cdot3$	12·1	−·1	+·1	(− ·8)
Dec. 7	3535	132	$k-2\cdot5$	$l-1\cdot3$	$m-1\cdot5$	$n-0\cdot3$	...	12·0	−·1	+·1	(− ·9)
1896 Jan. 19	3578	132	$k-2\cdot5$	$l-2\cdot0$	$m-2\cdot0$	$n-1\cdot5$	...	12·6	−·1	+·1	+ ·1
Jan. 30	3589	132	$k-3\cdot0$	$l-1\cdot0$	$m-2\cdot0$	...	...	12·4	−·1	+·1	0

1894 January 12. Not certainly seen 34, 80, 132. Sky slightly hazy.
1894 January 26. Barley caught 132 on a clear dark sky. 1896 January 4. Limit of vision 132: not seen 34, 80

R LYNCIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1896 Feb. 20	3610	80	$g-3\cdot0$	$h-2\cdot0$	$l-1\cdot0$	...	...	11·9	−·1	+·3	+ ·1
Mar. 1	3620	...	$f-3\cdot0$	$h-2\cdot0$	$k-1\cdot3$	$l-0\cdot5$	$m-0\cdot5$	11·5	−·1	0	− ·3
Mar. 29	3648	...	$f-1\cdot3$	$h-0\,5$	$k-0\cdot2$	$l+1\cdot0$	$m+0\cdot6$	10·1	0	0	− ·3
Apr. 16	3666	...	$f-1\cdot2$	$=h$	$k+0\cdot3$	$m+1\cdot0$	...	9·9	0	−·1	+ ·1
Apr. 28	3679	...	$e-1\cdot0$	$f-0\cdot7$	$=g$	$h+1\cdot0$	$k+1\cdot0$	9·3	0	0	0
May 9	3689	...	$e-0\cdot5$	$=f$	$h+1\cdot0$	$k+1\cdot0$	$m+1\cdot3$	9·0	+·1	0	− ·1
May 20	3700	...	$f+0\cdot2$	$h+1\cdot2$	$k+1\cdot2$	$l+2\cdot0$	$m+2\,0$	8 7	+·2	0	− ·2
June 10	3721	...	$a-1\cdot3$	$d+0\cdot3$	$f+1\cdot0$	$h+2\cdot0$	...	7 9	+·1	0	(−1·0)
June 17	3728	...	$a-1\cdot0$	$e+1\,0$	$f+1\,0$	$g+1\cdot4$	$h+1\cdot7$	7·9	+·1	+·1	(− ·9)
June 29	3740	...	$a-1\,0$	$e+1\cdot3$	$f+1\cdot3$	$g+2\cdot0$	$h+2\cdot0$	7·6	+·1	+·1	(−1·2)
July 7	3748	...	$a-1\cdot0$	$e+1\cdot0$	$f+1\cdot0$	$g+2\cdot0$	$h+2\cdot0$	7·7	+·1	+·1	(−1·3)
July 22	3763	...	$a-1\cdot3$	$e+1\cdot0$	$f+1\cdot0$	$g+1\cdot5$	$h+1\cdot5$	8·0	+·1	+·1	(−1·0)
July 30	3771	...	$a-1\cdot5$	$e+1\cdot0$	$f+1\cdot0$	$g+1\cdot5$	$h+1\cdot5$	8·0	+·1	+·1	(−1·1)
Aug. 12	3784	...	$a-1\cdot5$	$=f$	$h+1\cdot0$	$k+1\cdot3$	$m+1\cdot3$	9·0	+·1	0	(− ·4)
Aug. 26	3798	...	$e-1\cdot0$	$=f$	$h+1\cdot0$	$k+1\cdot0$	$m+2\cdot0$	9·0	+·1	0	(− ·9)
Sept. 10	3813	...	$e-1\,0$	$f-0\cdot7$	$g-0\cdot2$	$h+0\cdot3$	$k+0\cdot8$	9·6	0	0	(− ·5)
Sept. 20	3823	...	$f-1\cdot3$	$g-0\cdot3$	$=h$	$k+0\cdot2$	$m+1\cdot0$	9 9	0	0	− ·4
Oct. 8	3841	...	$f-2\,0$	$h-1\cdot0$	$k-1\cdot0$	$l+0\cdot3$	$m-0\cdot3$	10·8	−·1	0	− ·1
Oct. 27	3860	...	$h-2\cdot0$	$k-1\cdot5$	$l-0\cdot5$	$m-1\cdot5$	...	11·6	−·1	+·1	+ ·2
Nov. 2	3866	...	$f-3\cdot0$	$h-2\cdot0$	$k-1\cdot5$	$l-0\cdot6$	$m-1\cdot5$	11·7	−·1	0	0
Nov. 12	3876	80	$f-2\cdot5$	$g-2\cdot0$	$h-1\cdot5$	$k-1\cdot5$	$m-1\cdot5$	11·6	−·1	0	− ·3
Nov. 29	3893	80	$h-3\cdot0$	$k-2\cdot5$	$l-2\cdot0$	$m-2\cdot5$	$n-1\cdot0$	12·6	−·1	+·1	+ ·3
Dec. 11	3905	80	$g-3\cdot0$	$k-2\cdot5$	$l-1\cdot3$	$m-2\cdot5$	$n-1\cdot0$	12 5	−·1	+·1	− ·1
1897 Feb. 22	3978	80	$g-3\cdot0$	$k-2\cdot0$	$l-0\cdot5$	$m-1\cdot3$	$=n$	11 8	−·1	+·1	0
Mar. 3	3987	80	$f-4\cdot0$	$h-3\cdot0$	$k-2\cdot0$	$l-1\cdot0$	$m-1\cdot0$	12·2	−·1	0	+ ·5
Mar. 28	4012	...	$f-1\cdot3$	$h-0\cdot3$	$=k$	$l+1\cdot0$	$m+1\cdot0$	9·9	0	0	− ·6
Apr. 10	4025	...	$\left\{\begin{matrix}e-1\cdot0\\m+1\cdot0\end{matrix}\right.$	$f-1\cdot0$	$=g$	$h+0\cdot5$	$k+0\cdot5\}$	9·6	0	0	− ·3
Apr. 15	4030	...	$f-0\,8$	$g+0\cdot2$	$h+0\cdot2$	$k+1\cdot3$	$m+2\cdot0$	9·2	+·1	0	− ·4
May 5	4050	...	$e-0\cdot3$	$f-0\cdot3$	$g+1\cdot0$	$h+0\cdot7$	$l+2\cdot0$	8·9	0	+·1	− ·1
May 20	4065	...	$e+0\cdot7$	$f-0\cdot3$	$g+1\cdot2$	$h+0\,7$	$k+1\cdot2$	8·7	+·1	0	0
June 2	4078	...	$e+0\cdot5$	$f+0\cdot5$	$g+1\cdot2$	$h+1\cdot5$	$k+2\cdot0$	8·3	+·2	0	+ ·2
June 12	4088	...	$a-1\cdot3$	$e+1\cdot0$	$f+1\cdot0$	$g+2\cdot0$	$h+2\cdot0$	7 8	+·1	+·1	0
July 11	4117	...	$a-1\cdot0$	$e+1\cdot0$	$f+1\cdot0$	$g+2\,0$	$h+2\cdot0$	7·7	+·1	+·1	(+ ·3)
July 23	4129	...	$a-1\cdot3$	$e+1\cdot0$	$f+1\cdot0$	$g+2\cdot0$	$h+2\cdot0$	7·8	+·1	+·1	(+ ·5)
July 29	4135	...	$a-1\cdot3$	$e+1\cdot3$	$f+1\cdot3$	$g+2\cdot0$	$h+2\cdot0$	7·6	+·1	+·1	(+ ·3)
Aug. 6	4143	...	$a-1\cdot5$	$e+1\cdot3$	$f+1\cdot3$	$g+1\cdot6$	$h+2\cdot0$	7·8	+·1	+·1	(+ ·5)
Aug. 11	4148	...	$e+1\cdot0$	$f+1\cdot0$	$g+1\cdot7$	$k+2\,0$	$m+3\cdot0$	7·9	+·2	0	(+ ·6)
Aug. 25	4162	...	$e-0\cdot3$	$f+0\cdot3$	$g+1\cdot0$	$k+1\cdot3$	$m+1\cdot3$	8·8	+·1	0	(+1·3)
Sept. 3	4171	...	$e-1\cdot0$	$f-0\cdot3$	$h+1\cdot0$	$k+1\cdot3$	$m+1\cdot3$	9·1	0	0	(+1·3)
Sept. 18	4186	...	$f-1\cdot2$	$g-1\cdot2$	$h+0\cdot3$	$k+0\cdot7$	$m+1\cdot3$	9·3	0	0	(+1·4)
Oct. 6	4204	...	$f-1\cdot5$	$h-0\cdot5$	$k-0\cdot5$	$l+1\cdot0$	$n+0\cdot5$	10·2	0	0	(+1·1)
Oct. 21	4219	...	$g-2\cdot0$	$h-2\cdot0$	$k-1\cdot0$	$=l$	$m-1\cdot0$	11·3	−·1	+·1	+1·1
Nov. 2	4231	80	$g-2\cdot5$	$h-2\,0$	$k-2\cdot0$	$=l$	$m-2\cdot0$	11·8	−·1	+·1	+1·0
Nov. 29	4258	80	$f-3\cdot5$	$h-2\cdot0$	$k-2\cdot5$	$l-1\cdot5$	$m-2\cdot5$	12·4	−·1	0	+ ·1

1896 December 22. Limit of vision 132: not seen 34, 80.

R Lyncis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1897 Dec. 6	4265	132	$k-4\cdot0$	$l-2\cdot0$	$m-3\cdot0$	...	...	13·4	−·1	+·1	+1·1
1898 Jan. 22	4312	80	$h-2\cdot5$	$k-2\cdot5$	$l-1\cdot0$	$m-2\cdot5$	$n-1\cdot0$	12 3	−·2	+·1	(− ·5)
Feb. 8	4329	80	$h-2\cdot0$	$k-1\cdot7$	$l-1\cdot0$	$m-1\cdot3$	$n-1\cdot0$	11 8	−·2	+·1	(−1·0)
Mar. 2	4351		$f-2\cdot0$	$g-1\cdot0$	$h-1\cdot0$	$k+0\cdot2$	$m+1\cdot0$	10·4	0	0	(−2·1)
Mar. 20	4369	80	$f-4\cdot0$	$k-3\,0$	$l-1\cdot5$	$m-2\cdot0$	$n-1\cdot5$	12·7	−·2	+·1	(+ ·4)
Apr. 5	4385	80	$h-2\cdot3$	$k-2\cdot5$	$l-1\cdot3$	$m-1\cdot5$	$n-1\cdot0$	12·1	−·2	+·1	+ ·1
Apr. 23	4403	..	$h-1\cdot0$	$k-1\cdot5$	$=l$	$m-0\cdot5$	$n+1\cdot0$	10·8	−·1	+·1	− ·4
May 4	4414	...	$f-1\cdot3$	$g-1\cdot0$	$=h$	$k-0\cdot2$	$m+0\,8$	10·1	−·1	0	− ·6
May 28	4138	...	$e-2\,0$	$f-1\cdot3$	$h-0\cdot5$	$=k$	$m+1\cdot0$	10·2	−·1	0	+ ·3
June 7	4448	...	$e-1\cdot5$	$f-1\cdot0$	$g-0\cdot7$	$k+0\cdot7$	$m+1\cdot3$	9·7	−·1	0	+ ·2
June 16	4457	...	$a-2\cdot5$	$f+0\cdot2$	$h+2\cdot0$	$k+1\cdot0$	$m+2\cdot0$	8·7	+·2	0	− ·3
July 2	4473	...	$a-1\cdot5$	$f+1\cdot5$	$h+2\,0$	$k+2\cdot0$	$m+2\cdot0$	8·0	+·2	0	(− ·7)
July 11	4482	...	$a-1\cdot5$	$f+1\cdot0$	$h+2\cdot0$	$k+1\cdot7$	$m+2\cdot3$	8 1	+·2	0	(− ·4)
July 27	4498	...	$a-1\cdot3$	$f+1\cdot5$	$h+2\,3$	$k+2\cdot0$	$m+2\cdot0$	7 9	+·2	0	(− ·5)
Aug. 11	4513	...	$a-1\cdot0$	$e+2\cdot0$	$f+1\cdot7$	$g+2\cdot5$	$h+2\cdot5$	7·2	+·2	+·1	(−1·0)
Aug. 20	4522	...	$a-1\,3$	$e+1\cdot0$	$f+1\cdot5$	$g+1\cdot5$	$h+2\cdot0$	7·8	+·2	+·1	(− ·4)
Aug. 27	4529	...	$a-1\cdot5$	$e+1\cdot3$	$f+1\cdot5$	$g+2\cdot0$	$h+2\,0$	7·6	+·2	+·1	(− ·7)
Sept. 14	4547	...	$e-0\cdot2$	$f+0\cdot7$	$g+1\cdot5$	$k+1\cdot5$	$m+2\cdot0$	8 5	+·2	0	(0)
Sept. 20	4553	...	$e-0\cdot7$	$f+0\cdot7$	$g+1\cdot0$	$k+1\cdot5$	$m+2\cdot0$	8·7	+·2	0	(+ ·1)
Sept. 28	4561	...	$e-1\cdot0$	$=f$	$h+1\cdot5$	$k+1\cdot5$	$m+2\cdot0$	8·8	+·1	0	(0)
Oct. 12	4575	...	$f-1\cdot3$	$g-1\cdot0$	$=h$	$=k$	$=m$	10·3	−·1	0	+ ·8
Oct. 31	4594	...	$g-1\cdot3$	$h-1\cdot2$	$k-1\cdot0$	$l+1\cdot0$	$=m$	10·5	−·1	+·1	+ ·3
Dec. 7	4631	80	$h-2\cdot0$	$k-2\cdot0$	$l-1\cdot0$	$m-2\cdot0$	$n-0\cdot5$	11·9	−·2	+·1	(− ·7)
Dec. 15	4639	80	$h-2\cdot3$	$k-2\cdot5$	$l-1\cdot5$	$m-2\cdot5$	$n-1\cdot0$	12·4	−·2	+·1	(− ·6)
1899 Feb. 27	4713	80	$k-3\cdot0$	$l-2\cdot0$	$m-2\cdot0$	$n-1\cdot0$	...	12·6	−·2	+·1	(− ·7)
Mar. 9	4723	80	$h-2\cdot5$	$k-2\cdot0$	$l-1\cdot0$	$m-1\cdot5$	$n-1\cdot0$	12·0	−·2	+·1	(−1·3)
Mar. 15	4729	80	$h-3\cdot0$	$k-3\cdot0$	$l-1\cdot5$	$m-2\cdot0$	$n-1\cdot5$	12·6	−·2	+·1	(− ·6)
Apr. 8	4753	...	$h-2\cdot0$	$k-2\cdot0$	$l-1\cdot0$	$m-1\cdot0$	$n-0\cdot5$	11·7	−·2	+·1	(− ·9)
Apr. 17	4762	80	$h-2\cdot0$	$k-2\cdot5$	$l-1\cdot0$	$m-1\cdot7$	$n-1\cdot0$	12·1	−·2	+·1	(0)
Apr. 26	4771	...	$h-2\cdot0$	$k-2\cdot5$	$l-0\cdot5$	$m-1\cdot3$	$n-0\cdot5$	11·8	−·2	+·1	(0)
May 3	4778	...	$g-2\cdot0$	$k-1\cdot3$	$=l$	$m-0\cdot3$	$n+0\cdot3$	11·1	−·1	+·1	− ·2
May 22	4797	...	$f-2\cdot0$	$h-1\cdot0$	$k-0\cdot7$	$l+1\cdot0$	$m+0\cdot3$	10·5	0	0	− ·2
June 10	4816	...	$f-1\cdot3$	$g-0\cdot3$	$=h$	$=k$	$m+1\cdot0$	9·9	−·1	0	− ·4
June 29	4835	...	$f-1\cdot2$	$g+0\cdot5$	$h+0\cdot3$	$k+1\cdot0$	$m+2\cdot0$	9·3	+·2	0	(− ·2)
July 7	4843	...	$a-2\cdot0$	$=f$	$h+1\cdot0$	$k+1\cdot5$	$m+2\cdot0$	8·7	+·1	0	(− ·7)
July 8	4844	...	$a-2\cdot5$	$f-0\cdot3$	$h+1\cdot0$	$k+1\cdot5$	$m+2\cdot2$	8·8	+·1	0	(− ·6)
July 16	4852	...	$e+1\cdot0$	$f+1\cdot0$	$h+2\cdot3$	$k+2\cdot0$	$m+3\cdot0$	7·7	+·3	0	(−1·3)
July 27	4863	...	$a-1\cdot3$	$e+2\cdot0$	$f+2\cdot0$	$g+3\cdot0$	$h+3\cdot0$	7·0	+·2	+·1	(−1·8)
Aug. 9	4876	...	$a+0\cdot5$	$e+2\cdot5$	$f+2\cdot0$	$g+3\cdot0$	$h+3\cdot0$	6·5	+·3	+·1	(−1·9)
Aug. 18	4885	...	$a-1\cdot0$	$e+2\cdot0$	$f+2\cdot5$	$g+3\cdot0$	$h+3\cdot5$	6·7	+·2	+·1	(−1·8)
Aug. 23	4890	...	$a-1\cdot0$	$f+2\cdot5$	$h+3\cdot0$	$k+3\cdot0$	$m+4\cdot0$	6·9	+·2	0	(−1·6)
Sept. 3	4901	...	$a-1\cdot5$	$f+2\cdot0$	$g+2\cdot0$	$h+3\cdot0$	$k+3\cdot0$	7·3	+·2	0	(−1·2)
Sept. 15	4914	...	$a-1\cdot7$	$f+1\cdot7$	$h+3\cdot0$	$k+3\cdot0$	$l+4\cdot0$	7·2	+·2	+·1	(−1·2)
Sept. 28	4926	...	$a-2\cdot0$	$f+1\cdot0$	$g+0\cdot5$	$h+1\cdot7$	$m+2\cdot0$	8·5	+·2	0	(− ·1)
Oct. 5	4933	...	$e-1\cdot0$	$f+1\cdot0$	$h+2\cdot0$	$k+1\cdot7$	$m+2\cdot0$	8·5	+·2	0	− ·4

1899 January 5 and 28. Limit of vision 132: not seen 34, 80.

R Lyncis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1899 Oct. 14	4942	...	$e-1\cdot2$	$f+0\cdot6$	$h+1\cdot2$	$k+1\cdot5$	$m+2\cdot0$	8·8	+·2	0	−·2
Oct. 30	4958	...	$f-1\cdot0$	$g+0\cdot3$	$h+0\cdot7$	$k+0\cdot3$	$m+1\cdot3$	9·5	+·2	0	−·3
Nov. 17	4976	...	$f-1\cdot3$	$g-0\cdot6$	$h-0\cdot5$	$k-0\cdot3$	$m+0\cdot7$	10·2	−·1	0	−·7
Dec. 9	4998	80	$f-2\cdot0$	$h-0\cdot7$	$k-2\cdot0$	$m-1\cdot3$	$=n$	11·3	−·2	0	−·5
Dec. 27	5016	80	$f-3\cdot0$	$h-2\cdot0$	$k-1\cdot0$	$l-1\cdot0$	$m-1\cdot5$	11·7	−·2	0	...
											G.M.T.
1900 Jan. 10	5030	132	$k-3\cdot0$	$l-2\cdot0$	$m-2\cdot5$	$n-2\cdot0$	...	13·0	−·2	+·1	...
Jan. 18	5038	80	$h-2\cdot0$	$k-2\cdot0$	$l-1\cdot0$	$m-2\cdot0$	$n-0\cdot5$	11·9	−·2	+·1	...
Jan. 24	5044	132	$k-2\cdot0$	$l-1\cdot5$	$m-3\cdot0$	$n-1\cdot0$	...	12·5	−·2	+·1	..
Jan. 30	5050	132	$k-2\cdot0$	$l-1\cdot0$	$m-3\cdot0$	$n-0\cdot5$	...	12·2	−·2	+·1	...
											h m
Apr. 4	5114	80	$h-3\cdot0$	$k-3\cdot0$	$l-1\cdot5$	$m-2\cdot0$	$n-1\cdot0$	12·5	−·2	+·1	9 40
Apr. 13	5123	132	$k-3\cdot0$	$l-1\cdot5$	$m-2\cdot5$	$n-1\cdot0$	...	12·6	−·2	+·1	10 0
Apr. 19	5129	80	$h-3\cdot0$	$k-2\cdot0$	$l-0\cdot7$	$m-1\cdot0$	$n-0\cdot5$	11·8	−·2	+·1	9 40
Apr. 27	5137	80	$k-2\cdot5$	$l-1\cdot0$	$m-1\cdot7$	$n-1\cdot0$	...	12·1	−·2	+·1	9 0
May 25	5165	...	$f-2\cdot0$	$h-1\cdot0$	$k-1\cdot3$	$l-0\cdot5$	$m-1\cdot0$	11·2	−·2	0	10 10
June 9	5180	...	$f-2\cdot0$	$g-1\cdot5$	$=h$	$k-1\cdot0$	$m+0\cdot3$	10·6	−·1	0	10 20
June 26	5197	...	$f-1\cdot3$	$g-0\cdot5$	$=h$	$k+0\cdot3$	$m+1\cdot0$	9·9	0	0	10 50
July 7	5208	...	$f-1\cdot0$	$g-0\cdot2$	$h+0\cdot3$	$k+1\cdot0$	$m+2\cdot0$	9·4	+·1	0	10 10
July 16	5217	...	$e-1\cdot0$	$f-0\cdot5$	$h+1\cdot0$	$k+1\cdot3$	$m+2\cdot3$	9·0	+·1	0	10 40
Aug. 5	5237	...	$a-1\cdot5$	$e+1\cdot5$	$f+1\cdot5$	$g+2\cdot5$	$h+2\cdot5$	7·4	+·2	+·1	9 40
Aug. 15	5247	...	$e+1\cdot5$	$f+2\cdot0$	$g+2\cdot0$	$h+2\cdot8$	$k+3\cdot0$	7·1	+·3	0	9 40
Aug. 23	5255	...	$a-1\cdot0$	$e+1\cdot5$	$f+1\cdot5$	$g+2\cdot5$	$h+2\cdot8$	7·2	+·2	+·1	9 30
Aug. 30	5262	...	$a-1\cdot3$	$e+1\cdot5$	$f+2\cdot0$	$g+2\cdot0$	$h+3\cdot0$	7·3	+·2	+·1	9 0
Sept. 6	5269	...	$a-1\cdot0$	$e+2\cdot0$	$f+2\cdot5$	$g+3\cdot0$	$h+3\cdot0$	6·9	+·2	+·1	10 30
Sept. 14	5277	...	$a-1\cdot5$	$e+1\cdot0$	$f+2\cdot0$	$g+2\cdot0$	$h+2\cdot3$	7·5	+·2	+·1	9 20
Sept. 21	5284	...	$a-1\cdot5$	$f+2\cdot0$	$g+1\cdot5$	$h+3\cdot0$	$k+2\cdot7$	7·2	+·2	0	10 0
Oct. 5	5298	...	$a-2\cdot0$	$e+1\cdot0$	$f+1\cdot0$	$g+1\cdot5$	$h+2\cdot5$	7·9	+·2	+·1	7 40
Oct. 19	5312	...	$=e$	$f+1\cdot0$	$g+1\cdot5$	$k+2\cdot0$	$m+3\cdot0$	8·1	+·2	0	7 20
Nov. 10	5334	...	$e-1\cdot3$	$f-0\cdot3$	$g-0\cdot3$	$h+1\cdot0$	$m+1\cdot7$	9·3	−·1	0	10 0
Nov. 17	5341	...	$f-1\cdot0$	$g-0\cdot3$	$h+0\cdot5$	$k+0\cdot7$	$m+1\cdot0$	9·6	+·1	0	9 50
Nov. 30	5354	...	$e-2\cdot3$	$g-1\cdot0$	$h+0\cdot5$	$k+0\cdot5$	$m+1\cdot0$	10·0	0	0	6 50
Dec. 15	5369	...	$f-2\cdot3$	$k-1\cdot0$	$=l$	$m-0\cdot3$	$n+1\cdot0$	10·8	−·1	+·1	6 40
Dec. 28	5382	...	$h-1\cdot0$	$k-1\cdot0$	$=l$	$m-0\cdot3$	$n+0\cdot5$	10·8	−·1	+·1	6 50

1900 March 1. Not seen 34, 80, 132: air very clear.

1900 March 26. Limit of vision 132: not seen 34, 80.

R URSÆ MAJORIS.

R. A. $10^h\ 37^m\ 35^s$. Dec. $+69°\ 18'{\cdot}0$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1888 Dec. 9	0981	...	2+0·2	...	...	...	...	8·7	+·3	−·2	...
Dec. 29	1001	...	1−2·0	2−1·0	3+1·0	7+1·0	8+2·0	8·9	+·1	0	...
1889 Jan. 10	1013	...	2−1·5	3+0·3	4+1·0	6+0 5	7+0·3	9·6	+·2	0	...
Feb. 8	1042	...	3−0·5	4−0·5	5+0·5	=10	11+0·5	10·5	0	+·1	+ ·1
Feb. 23	1057	...	5−1 0	8−0·7	9−0·5	10−1·0	=11	11 3	−·2	+·1	− ·2
Mar. 5	1067	...	3−2·0	10−1·5	11+0·2	13−0·3	17+·02	11·3	0	+·2	− ·2
Mar. 13	1075	80	=11	=17	...	..	...	11·1	0	+·4	− ·4
Mar. 22	1084	80	11−1·0	17−1·0	...	...	...	12·1	−·2	+·4	+ ·2
Apr. 5	1098	80	8−1·5 19+0·3	9−1·0	11−0·7	17−0·7	18+0·3	12·0	−·1	+·2	− ·2
Apr. 18	1111	...	11−0·3	17−0·5	=18	=20	...	11·7	−·1	+·3	− ·5
Apr. 29	1122	80	11−1·0	17−1·0	=18	...	...	12·1	−·1	+·3	− ·1
May 10	1133	80	11−1·2	17−1·0	...	...	...	12·2	−·2	+·4	+ ·1
May 22	1145	80	11−0·5	17−0·3	19+1·0	20+0·3	21+0·3	11·3	0	+·3	− ·5
June 16	1170	80	=9	10−1·0	11+0·6	17+1·0	26+1·0	10·6	+·1	+·2	− ·5
June 29	1183	...	3−0·5	4+0·3	=8	9+0·5	10+0·7	10·2	+·1	0	− ·3
July 17	1201	...	2−0·2	3+1·5	6+1·7	7+1·0	8+2·0	8·6	+·2	−·1	+ ·3
July 26	1210	...	2+0·7	3+2·0	6+2·0	7+1·7	10+2·5	8·0	+·3	0	+ ·6
July 31	1215	...	1−1·0 10+4·0	2+2·0	3+3·5	6+3·0	7+3·0	6·8	+·2	0	− ·1
Aug. 6	1221	...	1−1·5	2+1·5	3+3·0	7+2·5	10+4·0	7·2	+·2	0	+ ·4
Aug. 13	1228	...	1−0·7	2+1·5	3+2·5	10+3·5	...	7·2	+·2	0	+ ·5
Aug. 26	1241	...	1−2·0	2+1·0	3+3·0	6+2·0	7+2·0	7·8	+·2	0	+1·0
Sept. 12	1258	...	1−2·0	2+1·5	3+3·0	6+2·5	7+2·5	7·5	+·2	0	+ ·4
Sept. 22	1268	...	1−1·5	2+1·0	3+2·5	6+2·5	7+2·0	7·7	+·2	0	+ ·4
Oct. 8	1284	...	1−1·3	2+0·7	3+1·5	6+1·5	7+1·0	8·3	+·2	0	+ ·5
Oct. 20	1296	...	1−2·0	2+0·5	3+2·0	6+1·3	7+1·3	8·4	+·2	0	+ ·2
Nov. 6	1313	...	2−1·0	3+1·0	6+1·5	7+1·0	8+2·0	8·9	+·2	−·1	− ·1
Nov. 25	1332	...	=3	=6	7−0·7	8+0·2	9+0·5	10·2	0	0	+ ·3
Dec. 11	1348	...	3−1·0	=8	9+0·2	10+0 2	11+0·5	10·6	+·1	0	0
Dec. 24	1361	...	8−0·6	9−0·6	10−1·0	=11	17+0·7	11·1	−·1	+·2	− ·1
1890 Jan. 12	1380	...	11−0·5	=17	20+0·5	21+0·5	26+0·5	11·1	+·1	+·3	− ·5
Feb. 8	1407	80	11−1 0	17−1·0	=19	20−0·5	21 0·5	12·1	−·2	+·3	− ·6
Feb. 22	1421	132	=18	19−0·5	=25	...	...	12·4	−·1	+·1	− ·7
Feb. 28	1427	132	11−2·0	17−1·5	19−0·5	...	...	12·7	−·2	+·3	− ·3
Mar. 9	1436	132	11−1·5	17−2·0	18−0·5	19−0·3	25+0·3	12·6	−·1	+·2	− ·5
Mar. 18	1445	80	18−0·5	19−0·5	20−1·0	21−1·3	25+0·3	12·6	−·1	+·2	− ·3
Apr. 11	1469	80	11−1·0 21−0·5	17−1·0	=18	=19	20−0·5	12·1	−·1	+·3	− ·3
Apr. 28	1486	80	=11	17+0·3	...	...	...	10·9	+·1	+·4	− ·2
May 7	1495	...	3−1·3	=9	10−0·3	11+1·2	17+1·5	10·5	0	+·2	− ·4
May 22	1510	...	2−1·3	3+1·0	6+0·8	7+0·6	8+1·5	9·3	+·2	−·1	− ·2
June 14	1533	...	1−2·0	2+1·0	3+1·7	6+2·0	7+1·7	8·1	+·2	0	+1·1

R Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1890 June 20	1539	...	1−1·5	2+0·5	3+1·5	6+1·8	7+1·5	8·2	+·2	0	+1·2
June 26	1545	...	1−1·5	2+0·7	3+1·7	6+2·0	7+1·7	8·1	+·2	0	+1·1
July 5	1554	...	1−1·5	2+1·0	3+2·0	6+3·0	7+2·5	7·6	+·2	0	+·5
July 11	1560	...	1−1·5	2+1·0	3+2·8	6+3·0	7+2·3	7·5	+·2	0	+·3
July 21	1570	...	1−2·5	2+0·5	3+2·0	6+1·8	7+1·5	8·3	+·2	0	+·8
Aug. 5	1585	...	2−0·3	3+1·6	6+2·0	7+1·3	8+2·0	8·5	+·2	−·1	+·4
Aug. 23	1603	...	2−0·7	3+1·0	6+1·0	7+0·7	10+2·0	9·0	+·2	0	+·5
Sept. 5	1616	...	2−1·5	3+1·0	6+1·0	7+0·5	10+2·0	9·2	+·2	0	−·1
Sept. 14	1625	...	2−1·2	3+0·5	6+0·6	=7	10+1·3	9·6	+·1	0	−·2
Oct. 1	1642	...	3−1·0	8−0·3	9+0·3	10+0·5	11+1·0	10·5	0	0	−·3
Oct. 10	1651	...	3−1·3	8−0·7	=9	10+0·2	11+0·3	10·9	0	0	−·2
Nov. 13	1685	80	11−1·0	17+0·3	18+0·6	20+0·5	21+0·5	11·3	+·1	+·3	−·6
Dec. 14	1716	80	17−1·5	18−0·5	19−0·5	20−1·0	...	12·6	−·2	+·3	−·6
1891 Jan. 6	1739	132	18−0·5	19−0·5	=25	...	...	12·5	−·1	+·1	−·8
Jan. 14	1747	80	11−2·5	17−2·0	18−1·0	19−0·7	20−1·0	13·0	−·2	+·3	−·1
Feb. 13	1777	132	18−0·5	19−0·5	20−0·5	...	...	12·4	−·2	+·2	−·4
Feb. 26	1790	80	17−1·6	18−0·2	20−0·5	21−1·0	25+1·0	12·2	−·1	+·3	+·1
Mar. 11	1803	80	11−0·2	17+0·2	=21	...	...	11·3	0	+·4	+·3
Mar. 26	1818	...	2−1·0	3+0·7	6+1·0	7+1·0	8+1·3	9·2	+·2	−·1	+·4
Apr. 10	1833	...	1−1·5	2−0·3	3+1·2	6+1·0	7+1·0	8·7	+·1	0	+·6
Apr. 27	1850	...	2+0·2	3+2·0	6+2·0	7+1·7	10+3·0	8·0	+·3	0	+·4
May 6	1859	...	1−2·0	2+0·3	3+2·0	6+2·0	7+1·5	8·2	+·2	0	+·6
May 16	1869	...	1−1·5	2+0·6	3+1·5	6+1·5	7+1·3	8·3	+·2	0	+·6
May 22	1875	...	1−2·0	2+0·7	3+1·5	6+1·5	7+1·3	8·4	+·2	0	+·6
June 5	1889	...	1−2·5	2−0·6	3+1·2	6+1·5	7+1·0	8·9	+·1	0	+·7
June 10	1894	...	1−3·0	2−0·8	3+1·2	6+1·4	7+1·2	9·0	+·1	0	+·6
June 21	1905	...	2−0·7	3+0·7	6+1·0	7+1·2	10+1·5	9·1	+·2	0	+·5
July 8	1922	...	3−0·2	6+0·2	7−0·3	10+0·8	...	9·9	0	0	+·2
July 26	1940	...	3−0·7	6−0·7	7−1·0	9+0·5	=10	10·4	−·1	0	−·5
Aug. 14	1959	...	8−1·5	9−0·6	10−1·0	11+0·4	17+1·5	11·0	0	+·2	−·8
Sept. 1	1977	...	10−1·5	11−0·7	17+0·5	=21	23−0·3	11·4	−·1	+·3	−·6
Sept. 12	1988	80	10−1·0	11−0·6	17+0·4	=20	21+0·4	11·4	0	+·3	−·6
Oct. 2	2008	80	11−0·2	17+0·2	19+0·7	20−0·5	21−0·5	11·6	0	+·3	−·4
Oct. 23	2029	80	11−1·5	=17	20−0·5	=21	...	11·9	−·1	+·3	−·3
Oct. 30	2036	...	11−1·3	17−0·3	19+0·3	20−0·5	=21	11·9	−·1	+·3	−·3
Nov. 23	2060	80	10−1·5	11−1·0	=17	=20	21+0·5	11·6	0	+·3	−·4
Dec. 4	2071	80	11−1·2	=17	=20	21+0·5	...	11·6	0	+·3	−·3
Dec. 19	2086	80	10−2·3	11−1·0	17+0·5	20+0·5	21+1·0	11·5	0	+·3	+·1
1892 Jan. 25	2123	...	1−1·3	2+0·7	3+1·5	7+1·5	10+2·0	8·2	+·2	0	+·1
Feb. 8	2137	...	1−2·0	2+1·5	3+2·5	7+2·5	...	7·6	+·2	0	+·6
Mar. 1	2159	...	1−2·0	2+1·5	3+2·5	6+2·5	7+2·5	7·6	+·2	0	+·7
Mar. 10	2168	...	1−2·0	2+2·0	3+3·0	9+4·0	10+4·0	7·1	+·2	0	+·1
Mar. 14	2172	...	1−1·7	2+1·3	3+2·6	6+3·3	7+2·6	7·4	+·2	0	+·2
Mar. 19	2177	...	1−1·5	2+1·3	3+2·3	6+2·6	7+2·3	7·5	+·2	0	+·2
Mar. 30	2188	...	1−2·0	=2	3+1·5	6+1·0	7+1·0	8·7	+·1	0	+1·0
Apr. 14	2203	...	1−2·0	=2	3+1·5	7+1·5	10+2·0	8·5	+·1	0	+·3

R URSÆ MAJORIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1892 Apr. 29	2218	...	2−1·5	3−1·0	6+1·0	7+0·7	10+2·0	9·6	+·1	0	+·7
May 18	2237	...	2−1·5	3−0·2	6+0·2	=7	10+0·6	10·0	0	0	+·2
June 2	2252	...	3−1·2	8+0·5	9+1·0	=10	11+2·0	10·1	+·1	0	−·3
June 11	2261	...	3−1·5	6−1·0	7−2·0	10−0·5	. =12	11·1	−·1	+·1	+·2
July 28	2308	80	11−1·0	17+0·2	19+0·5	=20	21+0·5	11·5	+·1	+·3	−·2
Aug. 19	2330	80	11−1·5	=17	19+0·5	20−0·5	21−0·5	11·9	−·1	+·3	−·2
Aug. 24	2335	80	11−2·0 25+0·5	17−1·0	=19	20−1·0	. =21	12·4	−·1	+·3	+·3
Sept. 12	2354	80	11−1·0	17+0·5	19+0·8	20−1·0	21−0·5	11·7	0	+·3	−·3
Oct. 5	2337	132	11−1·5	=17	...	...	...	11·9	−·1	+·4	+·1
Oct. 17	2389	80	9−1·5	11−0·7	17+0·5	21+1·0	...	11·3	0	+·3	−·2
Nov. 7	2410	...	2−1·3	3+0·3	6+0·5	7+0·5	11+2·0	9·5	+·2	0	+·1
Nov. 19	2422	...	1−1·7	2+0·3	3+1·5	9+2·0	10+2·0	8·5	+·2	0	+·4
Nov. 26	2429	...	1−2·0	2+1·0	3+2·0	7+1·5	8+2·0	8·2	+·2	0	+·4
Dec. 5	2438	...	1−1·5	2+1·2	3+2·2	7+2·2	10+3·0	7·7	+·2	0	+·2
Dec. 13	2446	...	1−1·2	2+1·0	3+2·0	7+2·0	10+2·5	7·8	+·2	0	+·4
Dec. 23	2456	...	1−1·3	2+1·3	3+2·5	7+2·5	10+3·0	7·5	+·2	0	+·1
1893 Jan. 2	2466	...	*a*−1·3	*h*+1·0	*n*+2·0	*o*+2·0	*q*+2·5	7·8	+·1	+·3	+·6
Jan. 13	2477	...	*a*−1·5	*h*+0·5	*n*+1·5	*o*+1·5	*q*+2·0	8·2	+·1	+·3	+·7
Jan. 26	2490	...	*a*−2·0	*h*−0·5	*n*+1·0	*o*+1·0	*q*+2·0	8·7	0	+·3	+·5
Feb. 7	2502	...	*h*−0·6	*n*+0·5	*o*+0·5	*p*+1·3	*q*+2·0	9·2	+·1	+·1	+·4
Mar. 1	2524	...	*n*−0·3	*o*−1·0	*p*+0·5	*q*+1·0	*r*+2·0	10·1	0	−·1	−·2
Mar. 10	2533	...	*n*−1·2	*o*−1·2	*p*−0·7	*q*+0·3	*r*+1·2	10·8	0	−·1	0
Mar. 18	2541	...	*n*−1·0	*p*−1·0	=*q*	*r*+1·0	*s*+1·0	10·9	0	−·1	−·2
Apr. 4	2558	...	*n*−2·0	*p*−1·0	=*q*	=*r*	=*s*	11·5	0	−·1	−·3
Apr. 12	2566	...	*p*−1·5	*q*−0·5	*r*+0·5	*s*+0·5	*t*+1·0	11·5	0	−·1	−·5
Apr. 26	2580	80	*p*−2·0	*q*−1·5	*r*−1·0	=*s*	...	12·3	−·1	−·1	−·4
May 8	2592	...	*p*−2·5	*q*−1·5	*r*−0·8	*s*−0·5	=*t*	12·6	−·1	−·1	−·3
May 25	2609	80	*p*−3·5	*q*−2·5	*r*−2·0	*s*−1·0	...	13·4	−·1	−·1	+·2
June 8	2623	80	*q*−3·0	*r*−2·0	*s*−1·0	*t*−0·5	...	13·4	−·1	−·1	(+·2)
June 29	2644	132	*r*−1·0	*s*−2·0	*t*−0·5	...	...	13·2	−·1	−·2	(0)
July 17	2662	80	*r*−1·0	=*s*	*t*+0·5	...	...	12·1	0	−·2	−·2
Aug. 5	2681	80	*n*−3·0	*o*−3·0	*q*−2·0	*r*−0·7	*s*+0·5	12·4	−·1	−·1	+·6
Aug. 17	2693	...	*n*−1·2	*o*−1·2	*r*+0·2	*s*+1·5	*t*+2·0	10·8	0	−·1	0
Sept. 2	2709	...	*a*−3·0	*h*−1·3	*n*+0·7	*o*+1·0	*r*+3·0	9·0	0	+·3	+·3
Sept. 12	2719	...	*a*−2·3	*h*−0·2	*n*+1·3	*o*+1·3	*r*+2·3	8·6	0	+·3	+·4
Oct. 3	2740	...	*a*−1·5	*h*+0·7	*n*+1·3	*o*+2·0	...	7·9	+·1	+·4	+·7
Oct. 18	2755	...	*a*−1·5	*h*+0·6	*n*+2·0	*o*+1·3	*p*+2·0	8·0	+·1	+·3	+·7
Oct. 31	2768	...	*a*−1·5	*h*+0·6	*n*+2·0	*o*+1·3	*p*+2·0	8·0	+·1	+·3	+·4
Nov. 9	2777	...	*a*−2·5	=*h*	*n*+1·8	*o*+1·5	*p*+2·0	8·3	+·1	+·3	+·6
Nov. 22	2790	...	*h*−0·6	*n*+0·8	*o*+1·0	*p*+1·5	*q*+2·0	9·0	+·1	+·1	+·7

R Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1893 Dec. 10	2808	...	$a-2\cdot0$ $r+2\cdot0$	$h-0\cdot5$	$n+1\cdot0$	$o+0\cdot6$	$q+2\cdot0$	8·7	+·1	+·2	− ·4
Dec. 21	2819	...	$h-1\cdot2$	$n+0\cdot5$	$o+1\cdot0$	$p+1\cdot0$	$q+2\cdot0$	9·2	+·1	+·1	− ·6
1894 Jan. 12	2841	...	$h-1\cdot5$	$n-0\cdot5$	$o-1\cdot0$	$r+1\cdot0$	...	10·4	−·1	0	− 6
Jan. 30	2859	...	$n-2\cdot0$	$p-1\cdot0$	$q-0\cdot3$	$r-0\cdot5$	$s+0\cdot5$	11·6	−·1	−·1	(− ·4)
Feb. 13	2873	80	$r-0\cdot5$	$s+0\cdot3$	$t+1\cdot0$	$u+1\cdot0$	...	11·8	0	−·1	(− ·6)
Feb. 28	2888	80	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot0$	$s-0\cdot5$	$t+1\cdot0$	12·2	−·1	−·1	(− ·8)
Mar. 11	2899	80	$p-2\cdot0$	$q-1\cdot2$	$r-1\cdot2$	$s-0\cdot7$	...	12·5	−·1	−·1	(− ·8)
Mar. 23	2911	132	$r-2\cdot0$	$s-1\cdot5$	$t-0\cdot5$	...	...	13·3	−·1	−·2	(− ·2)
Apr. 22	2941	80	$r-1\cdot0$	$s-1\cdot0$	$t-0\cdot5$	...	...	12·8	−·1	−·2	(− ·7)
May 3	2952	...	$q-3\cdot0$	$r-2\cdot0$	$s-1\cdot0$	$t-0\cdot3$	...	13·4	−·1	−·1	(+ ·1)
May 29	2978	80	$p-1\cdot3$	$q-0\cdot5$	$r-0\cdot3$	$s+0\cdot3$	$t+1\cdot0$	11·7	0	−·1	(−1·0)
June 9	2989	...	$n-1\cdot5$	$p-1\cdot5$	$q-0\cdot5$	$r+0\cdot7$	$s+1\cdot2$	11·2	0	−·1	− ·5
June 18	2998	...	$h-1\cdot5$	$n-0\cdot6$	$o-1\cdot0$	$r+1\cdot0$	$s+2\cdot0$	10·3	0	0	− ·2
July 3	3013	...	$a-2\cdot0$	$h-0\cdot5$	$n+1\cdot5$	...	...	8·3	0	+·6	0
July 19	3029	...	$a-1\cdot5$	$h+1\cdot0$	$n+2\cdot0$	$o+1\cdot3$	$p+2\cdot0$	7·9	+·1	+·3	+ ·9
Aug. 18	3059	...	$a-1\cdot5$	$h+1\cdot0$	$n+1\cdot7$	$o+1\cdot7$	$r+2\cdot3$	8·1	+·1	+·3	+1·1
Aug. 31	3072	...	$a-1\cdot5$	$h+0\cdot7$	$n+2\cdot0$	$o+1\cdot2$	$p+2\cdot0$	8·0	+·1	+·3	+ ·8
Sept. 14	3086	...	$a-1\cdot5$	$=h$	$n+1\cdot2$	$o+1\cdot0$	$p+2\cdot0$	8·4	+·1	+·3	+ ·8
Oct. 2	3104	...	$a-1\cdot5$	$h-0\cdot7$	$n+1\cdot0$	$o+1\cdot0$	$q+1\cdot5$	8·7	0	+·3	+ ·4
Oct. 25	3127	...	$h-1\cdot0$	$n+0\cdot4$	$o+0\cdot2$	$p+0\cdot8$	$r+2\cdot0$	9·5	+·1	0	+ ·2
Nov. 19	3152	...	$n-0\cdot3$	$o-1\cdot3$	$=p$	$q+1\cdot0$	$r+1\cdot5$	10·3	0	−·1	− ·1
Dec. 4	3167	...	$n-1\cdot3$	$o-1\cdot3$	$q-0\cdot3$	$r+1\cdot0$	$s+1\cdot5$	10·9	0	−·1	− ·2
Dec. 19	3182	...	$p-1\cdot0$	$q-0\cdot3$	$r-0\cdot3$	$s+1\cdot0$	$t+1\cdot6$	11·3	0	−·1	− ·6
Dec. 27	3190	...	$p-1\cdot3$	$q-0\cdot5$	$r-1\cdot0$	$=s$	$t+1\cdot0$	11·9	0	−·1	− ·2
1895 Jan. 17	3211	80	$p-2\cdot3$	$q-1\cdot0$	$r-2\cdot0$	$s-1\cdot0$	$t+0\cdot5$	12·7	−·1	−·1	+ ·1
Jan. 25	3220	80	$p-2\cdot5$	$q-2\cdot0$	$r-2\cdot0$	$s-1\cdot0$	$=t$	13·0	−·1	−·1	+ ·5
Feb. 16	3241	...	$p-2\cdot5$	$q-1\cdot5$	$r-1\cdot5$	$s-1\cdot0$	$=t$	12·8	−·1	−·1	+ ·8
Mar. 1	3254	80	$n-2\cdot5$	$q-1\cdot3$	$r-1\cdot0$	$s-0\cdot3$	$t+0\cdot6$	12·2	−·1	−·1	+ ·7
Mar. 17	3270	...	$n-1\cdot2$	$p-1\cdot0$	$=q$	$r+1\cdot0$	$s+1\cdot0$	10·9	0	−·1	0
Mar. 28	3281	...	$n-1\cdot0$	$p+0\cdot4$	$q+1\cdot0$	$r+1\cdot0$	$s+1\cdot0$	10·4	+·1	−·1	+ ·1
Apr. 12	3296	...	$h-1\cdot2$	$=n$	$=o$	$p+1\cdot0$	$r+1\cdot8$	9·7	0	0	0
May 1	3315	...	$a-2\cdot3$	$=h$	$n+1\cdot3$	$o+1\cdot3$	$p+2\cdot0$	8·4	+·1	+·3	+ ·2
May 10	3324	...	$a-1\cdot5$	$h+1\cdot0$	$n+1\cdot5$	$o+1\cdot5$	$r+2\cdot0$	8·2	+·1	+·3	+ ·6
May 29	3343	...	$a-1\cdot3$	$h+1\cdot0$	$n+1\cdot5$	$o+1\cdot5$	$p+2\cdot0$	8·0	+·1	+·3	+1·5
June 7	3352	...	$a-1\cdot4$	$h+1\cdot3$	$n+2\cdot0$	$o+2\cdot0$	$p+2\cdot5$	7·6	+·1	+·3	+ ·8
June 23	3368	...	$a-1\cdot3$	$h+0\cdot8$	$n+1\cdot3$	$o+1\cdot6$	$p+2\cdot0$	8·0	+·1	+·3	+ ·9
July 12	3387	...	$a-1\cdot5$	$h+0\cdot6$	$n+1\cdot3$	$o+1\cdot3$	$p+1\cdot6$	8·2	+·1	+·3	+ ·6
Aug. 6	3412	...	$h-0\cdot8$	$n+0\cdot8$	$o+0\cdot2$	$p+1\cdot2$	$r+2\cdot0$	9·3	+·1	0	+ ·4
Aug. 27	3433	...	$a-2\cdot3$	$h-0\cdot8$	$n+0\cdot2$	$o+0\cdot2$	$p+0\cdot8$	9·3	0	+·3	+ ·2
Sept. 7	3444	...	$h-1\cdot3$	$=n$	$=o$	$p+0\cdot8$	$q+1\cdot3$	9·7	0	+·1	− ·1
Sept. 21	3458	...	$h-1\cdot4$	$n-0\cdot3$	$o-0\cdot5$	$r+1\cdot0$	$s+2\cdot0$	10·1	0	0	− ·4
Oct. 4	3471	...	$n-1\cdot0$	$p-1\cdot0$	$q+1\cdot0$	$r+1\cdot0$	$s+2\cdot0$	10·5	0	−·1	− ·6
Oct. 19	3486	...	$p-1\cdot3$	$q-1\cdot0$	$r-0\cdot6$	$s+0\cdot5$	$t+1\cdot0$	11·8	0	−·1	0
Oct. 27	3494	80	$p-2\cdot0$	$q-1\cdot0$	$r-0\cdot3$	$s+1\cdot0$	$t+0\cdot7$	11·8	0	−·1	(− ·4)
Nov. 14	3512	80	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot0$	$s+0\cdot2$	$t+0\cdot7$	12·1	0	−·1	(− ·4)
Dec. 10	3538	...	$n-2\cdot0$	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot3$	$s-0\cdot2$	12·2	−·1	−·1	(− ·4)

R Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1896 Jan. 4	3563	...	$n-1\cdot3$	$o-1\cdot3$	$q-0\cdot3$	$=r$	$s+1\cdot0$	11·2	0	−·1	− ·4
Jan. 19	3578	...	$n-1\cdot3$	$p-0\,5$	$q+0\cdot6$	$r+0\cdot6$	$s+1\cdot0$	10·8	0	−·1	+ ·1
Jan. 30	3589	...	$n-0\cdot5$	$o-0\,2$	$q+1\cdot0$	$r+1\cdot5$	$s+2\cdot0$	10·0	0	−·1	− ·1
Feb. 20	3610	...	$a-1\cdot3$	$=h$	$n+1\cdot0$	$o+1\cdot2$	$r+2\cdot5$	8·4	+·1	+·3	+ ·5
Mar. 1	3620	...	$a-1\cdot5$	$h+1\cdot0$	$n+2\cdot0$	$p+2\cdot0$	$q+3\cdot0$	7·8	+·1	+·3	+ ·6
Mar. 14	3633	...	$a-1\cdot3$	$h+1\cdot3$	$n+2\cdot0$	$o+2\cdot0$	$p+2\cdot3$	7·6	+·1	+·3	+1·1
Mar. 18	3637	...	$a-1\cdot0$	$h+1\cdot0$	$n+2\cdot0$	$o+1\cdot7$	...	7·4	+·1	+·4	+1·0
Mar. 27	3646	...	$a-1\cdot0$	$h+1\cdot0$	$n+2\,0$	...	...	7·3	+·1	+·4	+ ·7
Apr. 5	3655	...	$a-0\cdot5$	$h+1\cdot0$	$n+2\cdot3$	$o+2\,0$	$p+2\cdot0$	7·5	+·1	+·3	+ ·6
Apr. 17	3667	...	$a-1\cdot3$	$h+1\cdot0$	$n+1\cdot8$	$o+2\cdot0$	$p+2\cdot0$	7·8	+·1	+·3	+ ·7
Apr. 26	3676	...	$a-1\cdot5$	$h+1\cdot0$	$n+1\cdot5$	$o+1\cdot5$	$r+2\cdot5$	8·1	+·1	+·3	+ ·7
May 6	3686	...	$a-1\cdot5$	$h+0\cdot6$	$n+1\cdot3$	$o+1\cdot3$	$q+2\cdot0$	8·3	+·1	+·3	+ ·7
May 26	3706	...	$a-2\cdot0$	$h-0\cdot4$	$n+1\cdot0$	$o+1\cdot0$	$p+1\cdot0$	8·8	0	+·3	+ ·1
June 17	3728	...	$h-1\cdot2$	$n-0\cdot2$	$o-0\cdot2$	$r+1\cdot3$	$s+2\cdot0$	10·0	0	0	− ·3
July 5	3746	...	$n-1\cdot0$	$o-1\cdot3$	$p-0\cdot5$	$q+0\cdot3$	$r+1\cdot0$	10 8	0	−·1	− ·5
July 22	3763	...	$n-1\cdot5$	$o-1\cdot2$	$p-1\cdot0$	$=q$	$=r$	11·2	−·1	−·1	− ·9
Aug. 6	3778	...	$n-1\cdot0$	$o-1\cdot3$	$p-1\cdot0$	$=q$	$=r$	11 2	−·1	−·1	(−1·2)
Aug. 18	3790	...	$o-2\cdot3$	$p-1\cdot7$	$q-1\cdot0$	$r-1\cdot0$	$=s$	12·2	−·1	−·1	(− ·3)
Sept. 10	3813	...	$n-3\cdot0$	$p-2\cdot0$	$q-1\cdot3$	$=s$	$t+0\cdot5$	12·3	0	−·1	(− ·4)
Oct. 8	3841	80	$p-2\cdot0$	$q-1\cdot5$	$r-1\cdot5$	$=s$	$=t$	12·5	−·1	−·1	(− ·6)
Oct. 27	3860	...	$p-2\cdot0$	$q-1\cdot5$	$r-1\cdot5$	$s-0\cdot5$	$=t$	12·6	−·1	−·1	(− ·5)
Nov. 3	3867	80	$p-3\cdot0$	$q-2\cdot0$	$r-2\cdot0$	$s-1\cdot0$	$t+0\cdot5$	13·0	−·1	−·1	(0)
Nov. 28	3892	...	$p-2\cdot3$	$q-1\cdot3$	$r-1\cdot0$	$=s$	$t+1\cdot0$	12·2	0	−·1	+ ·2
Dec. 12	3906	...	$h-1\cdot5$	$=n$	$o-0\cdot5$	$r+1\cdot5$	$s+2\cdot0$	10·0	0	0	− ·5
1897 Jan. 1	3926	...	$a-1\cdot5$	$h+1\cdot0$	$n+1\cdot7$	$o+1\cdot7$	$p+1\cdot7$	8·0	+·1	+·3	+ ·3
Jan. 14	3939	...	$a-1\cdot5$	$h+1\cdot0$	$n+1\cdot7$	$o+1\cdot7$	$p+2\cdot0$	7·9	+·1	+·3	+ ·7
Jan. 23	3948	...	$a-1\cdot3$	$h+1\cdot0$	$n+2\cdot0$	$o+2\cdot0$	$p+2\,5$	7·7	+·1	+·3	+ ·5
Feb. 3	3959	...	$a-1\cdot5$	$h+0\cdot5$	$n+1\cdot3$	$o+1\cdot3$	$p+2\cdot0$	8·2	+·1	+·3	+ ·9
Feb. 6	3962	...	$a-1\cdot7$	$h+0\cdot7$	$n+1\cdot3$	$o+1\cdot3$	$p+2\,0$	8·1	+·1	+·3	+ ·7
Feb. 22	3978	...	$h-0\cdot3$	$n+1\cdot0$	$o+1\cdot0$	$p+1\cdot6$	$r+2\cdot3$	8·9	+·1	0	+ ·4
Mar. 3	3987	...	$h-0\cdot8$	$=n$	$o+0\cdot5$	...	...	9·4	0	+·1	+ ·5
Apr. 15	4030	...	$h-2\cdot0$	$n-1\cdot0$	$=p$	$r+1\cdot5$	$s+2\cdot0$	10·3	0	0	+ ·3
Apr. 24	4039	...	$n-1\cdot0$	$p-0\cdot5$	$q+1\cdot0$	$r+1\cdot0$	$s+1\cdot7$	10·5	0	−·1	−1·0
May 21	4066	80	$n-2\cdot3$	$o-2\cdot3$	$r-0\cdot3$	$s+0\cdot3$	$t+1\cdot0$	11·8	0	−·1	...
July 29	4135	132	$q-2\cdot0$	$r-2\cdot0$	$s-1\cdot0$	...	...	13 2	−·1	−·1	...
Aug. 25	4162	132	$p-3\cdot0$	$q-2\cdot5$	$r-2\cdot5$	$s-1\cdot0$	$t-1\cdot0$	13·5	−·1	−·1	...
Sept. 6	4174	132	$p-3\,0$	$q-2\cdot0$	$r-2\cdot0$	$s-0\cdot5$	$t+0\cdot5$	12·9	−·1	−·1	...
Sept. 19	4187	...	$p-3\cdot0$	$q-2\cdot0$	$r-1\cdot3$	$=s$	$t+0\cdot5$	12·7	0	−·1	...
Oct. 6	4204	...	$n-0\cdot5$	$o-0\cdot3$	$p+0\cdot5$	$r+1\cdot5$	$s+2\cdot5$	10·0	0	−·2	...
Oct. 21	4219	...	$a-2\cdot0$	$h+1\cdot0$	$n+2\cdot0$	$o+2\cdot0$	$p+2\cdot0$	7·9	+·1	+·3	...
Oct. 26	4224	...	$a-2\cdot0$	$h+1\cdot3$	$n+2\cdot5$	$o+2\cdot0$	$p+2\cdot0$	7·7	+·1	+·3	...
Nov. 10	4239	...	$a-1\cdot3$	$h+1\cdot0$	$n+2\cdot0$	$o+2\cdot0$	$p+2\cdot0$	7·8	+·1	+·3	...
Nov. 25	4254	...	$a-2\cdot0$	$h+0\cdot7$	$n+2\cdot0$	$o+2\cdot0$	$p+3\cdot0$	7·8	+·1	+·3	...
Nov. 29	4258	...	$a-2\cdot0$	$h+1\cdot0$	$n+2\cdot0$	$o+2\cdot0$	$p+2\cdot0$	7·9	+·1	+·3	...
Dec. 9	4268	...	$a-2\cdot0$	$h+1\cdot0$	$n+2\cdot0$	$o+2\cdot0$	$p+2\cdot0$	7·9	+·1	+·3	+ ·3
Dec. 24	4283	...	$h+0\cdot3$	$n+1\cdot3$	$o+1\cdot3$	$p+2\cdot3$	$r+3\cdot0$	8·4	+·2	0	+ ·1

R Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1898 Jan. 7	4297	...	$a-2\cdot5$	$h-1\cdot0$	$n+1\cdot0$	$o+1\cdot3$	$p+1\cdot5$	8·8	+·1	+·2	+·2
Jan. 22	4312	...	$h-1\cdot3$	$n+0\cdot5$	$o+0\cdot5$	$p+1\cdot3$	$r+2\cdot0$	9·4	+·2	−·1	−·1
Feb. 8	4329	...	$=n$	$o-1\cdot0$	$p+1\cdot0$	$r+1\cdot5$	$s+2\cdot0$	10·0	+·1	−2	−·3
Feb. 23	4344	...	$n-1\cdot0$	$o-1\cdot0$	$p-0\cdot2$	$r+0\cdot8$	$s+1\cdot3$	10·7	0	−·2	−·3
Mar. 11	4360	...	$o-1\cdot3$	$p-1\cdot0$	$=q$	$r+0\cdot5$	$s+0\cdot5$	11·3	0	−·2	−·4
Mar. 29	4378	...	$o-2\cdot0$	$p-1\cdot0$	$q-0\cdot5$	$r-0\cdot5$	$s-0\cdot5$	11·9	−·2	−·2	−·7
Apr. 16	4396	...	$p-2\cdot0$	$q-1\cdot5$	$r-1\cdot0$	$=s$	$=t$	12·4	−·1	−·1	−·4
Apr. 29	4409	80	$n-3\cdot0$	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot0$	$s-0\cdot5$	12·5	−·2	−·1	−·5
May 12	4422	...	$p-2\cdot5$	$q-2\cdot0$	$r-2\cdot0$	$s-1\cdot0$	$t-1\cdot0$	13·2	−·2	−·1	+·2
May 23	4433	80	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot0$	$s-0\cdot3$	$t-0\cdot3$	12·4	−·2	−·1	−·6
June 7	4448	...	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot0$	$s-0\cdot3$	$=t$	12·4	−·2	−·1	−·4
June 16	4457	132	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot0$	$=s$	$t+0\cdot3$	12 2	−·1	−·1	−·4
July 16	4487	...	$p-1\cdot3$	$q-0\cdot5$	$=r$	$s+1\cdot0$	$t+1\cdot0$	11·5	0	−·1	(+·3)
July 27	4498	...	$n-0\cdot6$	$o-1\cdot3$	$p-0\cdot5$	$r+1\cdot0$	$s+2\cdot0$	10·6	0	−·2	(−·1)
July 31	4502	...	$h-2\cdot0$	$n-1\cdot0$	$p-0\cdot7$	$q+0\cdot3$	$r+1\cdot3$	10·6	0	0	(+·2)
Aug. 11	4513	...	$h-1\cdot2$	$n+0\cdot4$	$o+0\cdot7$	$p+1\cdot3$	$q+2\cdot0$	9·3	+·2	0	(+·2)
Aug. 20	4522	...	$a-2\cdot0$	$h+0\cdot5$	$n+1\cdot3$	$o+1\cdot0$	$p+1\cdot7$	8·4	+·2	+·2	(0)
Aug. 31	4533	...	$a-1\cdot3$	$h+1\cdot0$	$n+2\cdot0$	$o+2\cdot0$	$p+2\cdot7$	7·6	+·2	+·2	(−·4)
Sept. 14	4547	...	$a-1\cdot5$	$h+2\cdot0$	$n+2\cdot5$	$o+2\cdot0$	$p+2\cdot3$	7·4	+·2	+·2	(+·2)
Sept. 20	4553	...	$a-2\cdot0$	$h+1\cdot5$	$n+2\cdot3$	$o+2\cdot0$	$p+2\cdot5$	7·6	+·2	+·2	+·7
Sept. 28	4561	...	$a-1\cdot5$	$h+1\cdot5$	$n+2\cdot3$	$o+1\cdot7$	$p+2\cdot3$	7·6	+·2	+·2	+·8
Oct. 9	4572	...	$a-2\cdot0$	$h+1\cdot5$	$n+2\cdot3$	$o+2\cdot0$	$q+3\cdot0$	7·6	+·2	+·2	+·8
Oct. 23	4586	...	$a-2\cdot5$	$h+0\cdot7$	$n+2\cdot0$	$o+1\cdot5$	$p+2\cdot0$	8·2	+·2	+·2	+1·0
Nov. 4	4598	...	$a-3\cdot0$	$h+1\cdot0$	$n+2\cdot0$	$o+2\cdot0$	$p+2\cdot0$	8·1	+·2	+·2	+·5
Nov. 18	4612	...	$h-0\cdot3$	$n+1\cdot0$	$o+1\cdot0$	$p+1\cdot3$	$r+2\cdot7$	8·9	+·2	−·1	+·4
Dec. 13	4637	...	$h-1\cdot3$	$=n$	$o-0\cdot3$	$p-0\cdot3$	$r+1\cdot5$	10·1	−·1	−·1	+·3
Dec. 20	4644	...	$h-1\cdot5$	$=n$	$o+0\cdot7$	$p+1\cdot0$	$r+2\cdot0$	9·6	+·1	−·1	(−·4)
1899 Jan. 5	4660	...	$o-1\cdot5$	$p-1\cdot0$	$q+0\cdot5$	$r+0\,3$	$s+1\cdot0$	11·1	0	−·2	(−·1)
Jan. 23	4678	...	$o-2\cdot0$	$p-1\cdot0$	$=q$	$=r$	$s+1\cdot0$	11·4	0	−·2	(−1·0)
Feb. 1	4687	80	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot5$	$s-0\cdot5$	$t+1\cdot0$	12·3	−·1	−·1	(−·8)
Feb. 13	4699	80	$q-1\cdot0$	$r-2\cdot0$	$s-1\cdot0$	$t+0\cdot5$	...	12·7	−·1	−·1	(−·7)
Feb. 27	4713	80	$p-3\cdot0$	$q-2\cdot0$	$r-2\cdot0$	$s-1\cdot0$	$=t$	13·1	−·2	−·1	(−·4)
Mar. 9	4723	...	$p-2\cdot5$	$q-2\cdot0$	$r-2\cdot0$	$s-1\cdot3$	$t-0\cdot3$	13·1	−·2	−·1	(−·4)
Mar. 15	4729	132	$p-2\cdot0$	$q-1\cdot0$	$r-2\cdot0$	$s-1\cdot0$	$=t$	12·7	−·2	−·1	(−·7)
Apr. 4	4749	80	$n-3\cdot0$	$o-3\cdot0$	$r-1\cdot5$	$s-1\cdot0$	$t-0\cdot5$	12·9	−·2	−·1	−·2
Apr. 26	4771	132	$p-2\cdot0$	$q-1\cdot0$	$r-2\cdot0$	$s-1\cdot5$	$t-1\cdot0$	13·0	−·2	−·1	+·3
May 3	4778	132	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot0$	$=s$	$t+1\cdot0$	12·1	−·1	−·1	−·3
May 22	4797	80	$n-3\cdot0$	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot0$	$s+0\cdot3$	12·3	−·1	−·1	+·5
June 10	4816	...	$n-1\cdot3$	$o-1\cdot7$	$p-0\cdot5$	$q+1\cdot0$	$r+1\cdot2$	10·8	0	−·1	+·5
June 16	4822	...	$h-1\cdot5$	$n+0\cdot8$	$o-0\cdot5$	$p+1\cdot0$	$q+2\cdot0$	9·5	+·1	0	+·1
June 23	4829	...	$h-1\cdot0$	$n+1\cdot0$	$o+1\cdot0$	$p+1\cdot5$	$q+2\cdot0$	9·0	+·2	0	(+·2)
July 3	4839	...	$h-1\cdot3$	$n+1\cdot3$	$o+1\cdot3$	$p+2\cdot0$	$q+3\cdot0$	8·6	+·2	0	(+·3)
July 8	4844	...	$h-1\cdot3$	$n+1\cdot0$	$o+1\cdot5$	$p+2\cdot0$	$q+3\cdot0$	8·7	+·2	0	(+·5)
July 14	4850	...	$a-3\cdot0$	$h-0\cdot5$	$n+2\cdot5$	$o+2\cdot0$	$p+2\cdot5$	8·2	+·1	+·2	(+·2)
July 20	4856	...	$a-3\cdot0$	$h+0\cdot6$	$n+1\cdot5$	$o+1\cdot5$	$p+2\cdot0$	8·4	+·2	+·2	(+·6)
July 27	4863	...	$h+0\cdot5$	$n+2\cdot0$	$o+2\cdot0$	$p+2\cdot5$	$q+3\cdot0$	7·9	+·3	0	(0)

R Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1899 Aug. 6	4873	...	$h-1\cdot2$	$n+1\cdot0$	$o+1\cdot0$	$p+2\cdot0$	$r+3\cdot0$	8·8	+·2	−·1	(+·6)
Aug. 12	4879	...	$h+0\cdot2$	$n+2\cdot0$	$o+2\cdot0$	$p+3\cdot0$	$q+4\cdot0$	7·7	+·3	0	(−·4)
Aug. 18	4885	...	$h-0\,8$	$n+1\cdot2$	$o+1\cdot2$	$p+2\cdot0$	$q+3\cdot0$	8·6	+·2	0	(+·3)
Aug. 23	4890	...	$h-1\cdot2$	$n+1\cdot5$	$o+1\cdot2$	$p+1\cdot7$	$q+2\cdot3$	8 8	+·2	0	(+·3)
Sept. 2	4900	...	$h-1\cdot2$	$n+0\,8$	$o+0\cdot5$	$p+1\cdot7$	$r+2\cdot5$	9·1	+·2	−·1	(+·2)
Sept. 18	4916	...	$h-1\cdot5$	$n+0\cdot3$	$=o$	$p+1\cdot3$	$q+2\cdot0$	9·5	+·1	0	(+·1)
Sept. 28	4926	...	$h-1\cdot3$	$n+0\cdot7$	$o+0\cdot5$	$q+1\cdot5$	$r+2\cdot0$	9·4	+·2	0	(−·3)
Oct. 7	4935	...	$h-2\cdot0$	$=n$	$o-1\cdot0$	$p-1\cdot0$	$=q$	10 7	−·1	0	+·4
Oct. 14	4942	...	$n-0\cdot5$	$o-1\cdot0$	$p-0\cdot5$	$q+0\cdot5$	$r+1\cdot3$	10·5	0	−·1	−·3
Oct. 30	4958	...	$n-2\cdot0$	$p-1\cdot2$	$q-0\cdot5$	$r-0\cdot3$	$s+1\cdot0$	11·5	−·1	−·1	+·1
Nov. 19	4978	80	$n-3\cdot0$	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot0$	$s+0\cdot5$	12·2	−·1	−·1	0
Dec. 6	4995	132	$p-2\cdot0$	$q-1\cdot5$	$r-2\cdot0$	$s-1\cdot0$	$=t$	12·8	−·2	−·1	0
Dec. 27	5016	80	$p-1\cdot5$	$q-1\cdot0$	$r-2\cdot0$	$s-1\cdot0$	$=t$	12·6	−·2	−·1	...
1900 Jan. 7	5027	...	$p-2\cdot0$	$q-1\cdot0$	$r-2\cdot0$	$s-1\cdot0$	$t-0\cdot5$	12·8	−·2	−·1	...
Jan. 18	5038	132	$n-3\cdot0$	$o-3\cdot0$	$r-1\cdot7$	$s-1\cdot0$	$=t$	12·8	−·2	−·1	...
Jan. 24	5044	80	$n-3\cdot0$	$o-3\cdot0$	$r-2\cdot0$	$s-1\cdot0$	$t+0\,2$	12·9	−·1	−·1	...
Jan. 30	5050	132	$p-2\,0$	$q-1\cdot0$	$r-2\cdot3$	$s-1\cdot3$	$=t$	12·8	−·2	−·1	...
Feb. 17	5068	132	$n-2\cdot5$	$o-3\cdot0$	$r-2\cdot0$	$s-1\cdot0$	$=t$	12·8	−·2	−·1	...
Mar. 1	5080	...	$n-2\cdot5$	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot0$	$s-0\cdot3$	12·3	−·2	−·1	G.M.T. h. m.
Mar. 16	5095	...	$n-1\cdot5$	$p-1\cdot0$	$q+0\cdot5$	$r+1\cdot0$	$s+2\cdot0$	10·7	0	−·1	7 30
Mar. 26	5105	...	$n-0\cdot7$	$o-0\cdot7$	$p+0\cdot2$	$q+1\cdot0$	$r+1\cdot8$	10·2	0	−·1	8 0
Apr. 13	5123	...	$h-0\cdot5$	$n+1\cdot0$	$o+1\cdot5$	$p+2\,0$	$q+2\cdot5$	8·6	+·2	0	8 50
Apr. 19	5129	...	$h+0\cdot5$	$n+2\cdot0$	$o+1\cdot7$	$p+2\cdot5$	$q+3\cdot0$	8·0	+·3	0	9 10
Apr. 26	5136	...	$a-3\cdot0$	$h+1\cdot0$	$n+2\cdot0$	$o+2\cdot0$	$q+3\cdot0$	8·0	+·2	+·2	9 30
May 22	5162	...	$a-2\cdot5$	$h+1\cdot5$	$n+2\cdot5$	$o+2\,0$	$p+2\cdot7$	7·7	+·2	+·2	10 0
May 31	5171	...	$a-1\cdot5$	$h+1\cdot5$	$n+2\cdot3$	$o+2\cdot5$	$p+3\cdot0$	7·3	+·2	+·2	10 0
June 9	5180	...	$a-3\cdot0$	$h+1\cdot5$	$n+2\cdot3$	$o+2\cdot3$	$p+2\cdot5$	7·8	+·2	+·2	10 10
June 17	5188	...	$h+0\cdot7$	$n+1\cdot7$	$o+1\cdot5$	$p+2\,0$	$q+3\cdot0$	8·1	+·3	0	11 0
June 26	5197	...	$h-0\cdot7$	$n+1\cdot3$	$o+1\cdot3$	$p+2\cdot0$	$r+2\cdot5$	8·7	+·2	−·1	10 20
July 7	5208	...	$h-1\cdot0$	$n+1\cdot0$	$o+1\cdot0$	$p+1\cdot3$	$r+2\cdot5$	9·0	+·2	−·1	10 0
July 16	5217	...	$h-1\cdot3$	$n+1\cdot0$	$o+1\cdot0$	$p+1\cdot5$	...	9·0	+·2	0	10 0
Aug. 14	5246	...	$n+0\cdot2$	$p+1\cdot0$	$q+1\cdot5$	$r+1\cdot5$	$s+2\cdot5$	9·6	+·3	−·1	9 50
Aug. 23	5255	...	$n-0\cdot5$	$o-1\cdot0$	$p-0\cdot2$	$r+1\cdot0$	$s+1\cdot8$	10·7	0	−·2	9 30
Sept. 3	5266	...	$n-1\cdot3$	$p-1\cdot0$	$=q$	$r+1\cdot0$	$s+2\cdot0$	10·8	0	−·1	9 40
Sept. 13	5276	...	$n-1\,7$	$p-1\cdot3$	$q-0\cdot6$	$r+1\cdot0$	$s+2\cdot0$	11·0	0	−·1	9 20
Sept. 23	5286	...	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot0$	$s+1\cdot0$	$t+1\cdot3$	11·8	0	−·1	8 0
Oct. 10	5303	132	$p-2\cdot5$	$q-1\cdot7$	$r-1\cdot0$	$s+1\cdot0$	$t+1\cdot0$	12·1	0	−·1	7 50
Oct. 19	5312	80	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot3$	$s+0\cdot2$	$t+0\cdot5$	12·2	0	−·1	7 30
Oct. 27	5320	80	$p-2\cdot0$	$q-1\cdot3$	$r-1\cdot7$	$s-0\cdot3$	$t-1\cdot0$	12·8	−·2	−·1	10 0
Nov. 13	5337	132	$p-2\cdot7$	$q-2\cdot0$	$r-2\cdot0$	$s-1\cdot0$	$=t$	13·0	−·2	−·1	7 50
Dec. 15	5369	132	$p-2\cdot5$	$q-1\cdot5$	$r-2\cdot3$	$s-1\cdot0$	$=t$	13·0	−·2	−·1	6 50
Dec. 28	5382	132	$p-2\cdot0$	$q-1\cdot0$	$r-1\cdot5$	$s-0\cdot5$	$t+0\cdot6$	12·4	−·1	−·1	6 40

T URSÆ MAJORIS.

R. A. $12^h\ 31^m\ 50^s$. Dec. $+60°\ 2'{\cdot}3$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1887 June 30	0453	...	8−1·2	9−1·0	=11	13−0·5	14+1·0	11·0	−·1	+·1	...
July 15	0468	...	1−1·2	2−1·0	=3	=4	5+0·5	8·7	−·1	+·4	...
Aug. 1	0485	...	3+0·5	4+0·7	7+1·2	...	...	8·1	+·3	+·4	...
Aug. 4	0488	...	=1	2+0·5	3+1·5	4+2·0	6+2·5	7·2	+·3	+·3	...
Aug. 13	0497	...	1−0·2	=2	3+1·2	4+1·0	6+2·0	7·7	+·1	+·3	...
Sept. 10	0525	...	1−1·0	3+0·3	4+0·2	5+1·5	6+0·7	8·4	+·2	+·3	...
Sept. 22	0537	...	3+0·5	=4	5+2·0	6+0·7	7+1·5	8·2	+·2	+·3	...
Oct. 13	0558	...	5−1·0	8+0·5	9+1·0	13+0·5	...	9·8	+·2	+·3	...
Nov. 15	0591	...	11−0·5	=12	14+0·7	...	...	11·1	0	+·2	...
Dec. 7	0613	80	=14	...	...	...	...	11·5	0	+·5	...
1888 Mar. 14	0711	...	4−1·0	=5	6−0·5	...	...	9·6	−·2	+·3	...
Apr. 10	0738	...	=1	2+0·5	3+1·5	4+1·0	5+2·0	7·4	+·2	+·4	...
Apr. 26	0754	...	1+1·0	2+1·3	3+3·0	4+2·5	...	6·2	+·3	+·4	...
May 11	0769	...	1+0·5	2+0·7	3+1·8	4+1·5	6+2·5	7·1	+·3	+·3	...
May 23	0781	...	1−0·5 7+1·5	=2	3+0·8	4+1·0	6+1·0	8·0	+·2	+·3	...
June 27	0816	...	4−2·0	5−0·2	6−1·5	8+1·2	9+1·0	9·9	−·1	+·2	...
July 11	0830	...	8−0·5	9−0·5	11+0·5	12+0·5	13+0·5	10·6	0	0	...
Aug. 2	0852	80	8−1·5	9−2·0	11−0·5	12−0·2	14+1·0	11·5	−·1	+·1	...
Aug. 14	0864	80	...	11−1·0	12−0·3	13−2·0	14+0·2	11·8	−·1	+·2	...
Aug. 30	0880	80	8−1·3	9−1·3	11−1·5	12−0·5	14+0·2	11·8	−·1	+·1	...
Sept. 6	0887	...	8−2·5	9−2·5	11−2·0	12−1·0	14+0·5	12·4	−·1	+·1	...
Sept. 30	0911	...	8−2·0 14+0·2	9−2·0	11−2·5	12−2·0	13−2·0	12·5	−·1	+·2	...
Oct. 9	0920	...	8−2·0 14+0·2	9−2·0	10−0·8	11−0·8	12−0·5	11·9	−·1	+·1	...
Oct. 21	0932	80	11−1·0	12−0·5	14+0·5	...	...	11·5	−·1	+·2	...
Oct. 30	0941	...	8−1·5	9−1·5	11−1·0	12−0·2	14+1·0	11·5	−·1	+·1	...
Nov. 22	0964	...	4−1·0	5+0·5	6−1·0	8+1·0	9+1·0	9·5	+·1	+·2	...
Dec. 9	0981	...	1+2·5	2+2·0	3+3·5	6+3·5	7+3·5	5·6	+·3	+·3	...
Dec. 28	1000	...	1+1·0	2+1·5	3+2·5	4+3·0	6+3·0	6·3	+·3	+·3	...
1889 Jan. 7	1010	...	1+0·7	2+1·0	3+2·0	4+2·6	...	6·6	+·3	+·4	...
Feb. 4	1038	...	1+0·5	2+1·0	3+2·0	4+2·0	5+2·5	6·8	+·3	+·4	...
Feb. 15	1049	...	1−0·5 6+1·0	2+0·3	3+1·0	4+1·0	5+2·0	7·8	+·2	+·4	...
Mar. 1	1063	...	=3	4−0·2	5+1·0	6+0·2	7+0·6	8·8	+·1	+·3	+·3
Mar. 13	1075	...	4−1·3	5+1·0	6−0·5	8+2·0	9+2·0	9·0	+·1	+·2	−·3
Mar. 25	1087	...	5−0·5	7−1·0	8+0·7	9+0·7	13+0·5	9·8	+·1	+·3	0
Apr. 21	1114	...	8−1·0 16−0·3	9−1·5	13−2·0	=14	=15	11·6	−·1	+·3	−·2
May 10	1133	132	14−0·5	15−1·0	16−1·0	=17	...	11·9	−·2	+·5	−·4
May 22	1145	80	13−3·0	14−0·5	15−2·0	16−2·0	17−1·0	12·8	−·2	+·4	+·2
June 29	1183	80	14−0·8	15−2·0	16−1·5	17−1·0	...	12·6	−·2	+·5	+·2

1888 Jan. 14, Feb. 7. Barely visible with 80, 132.

T Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1889 July 17	1201	132	=14	15−1·5	16—1·0	17−0·5	...	12·1	−·2	+·5	0
July 29	1213	80	8−2 0	14+1·0	15−1·0	16−1·0	=17	11·7	−·1	+·4	+ ·1
Aug. 11	1226	...	5−1 0	7−1·0	8+1·0	9+0·5	=13	9·8	0	+·3	−1·2
Aug. 28	1243	...	1−0·7	2−0·5	=3	4+0·7	6+0·5	8·5	0	+·3	−1·2
Sept. 12	1258	...	1−0·5	2−0·3	3+0·7	4+1·0	6+1·3	8·0	+·1	+·3	− ·6
Sept. 22	1268	...	1−·0·3	=2	=3	4+1·0	6+1·0	8·2	+·1	+·3	0
Oct. 7	1283	...	1+0 5	2+0·5	3+1·0	4+1·0	6+1·3	7·6	+·3	+·3	0
Oct. 19	1295	...	1+0·7	2+1·0	3+1·5	4+1·3	6+1·5	7·3	+·3	+·3	− ·4
Nov. 6	1313	...	2−1·0	3+0·3	4+0·3	5+1·7	6+1·0	8 3	+·2	+·3	+ ·1
Nov. 25	1332	...	4−1·0	=5	6−0·5	8+1·5	9+1·5	9·3	0	+·2	0
Dec. 11	1348	...	5−1·3	8−0·2	=9	=11	14+1·0	10·6	0	+·2	+ ·4
Dec. 22	1359	...	8−1·0	9−0·8	11−0·5	=12	...	11·3	−·2	0	0
1890 Jan. 8	1376	80	15−0·5	16−0·5	...	...	...	11·5	−·2	+·4	− ·6
Feb. 8	1407	132	14−1·5	15−1·0	16−1·0	17−1·0	...	12·4	−·2	+·5	+ ·1
Feb. 25	1424	...	14−0·5	...	...	...	...	12·0	−·2	+·5	− ·1
Mar. 9	1436	...	11−1·3	12−0·3	14−0·7	15−1·0	17+0·5	11 8	−·1	+·3	− ·2
Mar. 19	1446	...	11−1·0	12−0·3	14−0·3	=15	17+0·5	11·4	−·1	+·3	− ·3
Mar. 30	1457	...	8−0·8	9−0·5	13−1·0	14+1·0	16+0·2	11·1	0	+·2	− ·1
Apr. 8	1466	...	5−1·0	8+0·5	9+0·5	=13	16+1·0	10·1	+·1	+·2	− ·4
Apr. 22	1480	...	3−1·0	4−0·6	5+0·3	6−1·2	13+1·3	9·5	−·1	+·3	+ ·2
May 5	1493	...	1−0·5	2+0·3	3+1·0	4+1·5	6+2·0	7 6	+·2	+·3	−1·0
May 14	1502	...	1+1·5	2+2·0	3+3·0	4+2·0	6+3·0	6·2	+·3	+·3	− ·5
May 22	1510	...	1+1·5	2+2·0	3+3·0	4+3·0	6+4·0	5·8	+·3	+·3	− ·4
May 27	1515	...	1+1·5	2+2·0	3+2·5	4+2·5	...	6·1	+·3	+·4	0
June 14	1533	...	1+1·0	2+1·3	3+2·0	4+2·3	6+2·7	6·6	+·3	+·3	+ ·3
June 24	1543	...	1+1·5	2+1·5	3+2·0	4+1·7	6+2·0	6·8	+·3	+·3	+ ·2
July 5	1554	...	1+0·7	2+1·0	3+1·5	4+1·3	6+2·0	7·2	+·3	+·3	0
July 22	1571	...	1−1·5	2−1·0	3+1·0	4+0·5	6+0·7	8·6	+·1	+·3	+ ·4
Aug. 13	1593	...	5−1·0	8+0·7	9+0·7	13+0·3	...	10·0	+·2	+·3	+ ·5
Aug. 23	1603	...	4−0·6	8−0·7	9−0·5	11+0·7	12+1·0	10·3	0	+·1	− ·2
Sept. 5	1616	...	9−1·0	14+1·0	=15	=16	17+0·5	11·0	0	+·4	+ ·1
Sept. 14	1625	...	=12	14+0·7	15−0 6	16−0·2	17+1·0	11·1	0	+·4	− ·3
Oct. 3	1644	132	13−2·0	14−0·2	15−1·5	16−1·0	17−0·5	12 1	−·2	+·4	− ·2
Oct. 14	1655	132	13−2·0	14−1·0	15−1·5	16−1·3	17−1·0	12·5	−·2	+·4	+ ·1
Nov. 1	1673	132	14−1·0	16−2·0	17−1·3	...	...	12·8	−·2	+·4	+ ·3
Dec. 14	1716	80	13−1·6	14−0·2	15−0·5	16−1·0	17+0·2	11·7	−·1	+·4	− ·4
1891 Jan. 4	1737	...	3−1·7	5−0·5	8+0·6	9+0·6	13+1·0	9·8	+·1	+·3	− ·2
Jan. 11	1744	...	2−1·5	3−0·7	5+0·3	6−0·8	13+1·0	9·4	−·1	+·3	+ ·1
Feb. 13	1777	...	1−0·5	2−0·4	3+1·0	5+1·6	6+1·3	8·0	+·1	+·3	+ ·3
Feb. 22	1786	...	1−0·7	2−0·2	3+1·2	5+1·3	6+1·0	8·1	+·1	+·3	+ ·4
Mar. 3	1795	..	1−1·0	2−0·5	3+1·0	4+1·3	6+1·3	8·1	+·1	+·3	+ ·2
Mar. 11	1803	..	1−·1·0	2−0·7	3+0·7	4+1·5	5+2·0	7·9	+·1	+·4	0
Mar. 26	1818	...	1−1·5	2−1·0	3+0·3	4+0·5	5+1·5	8·4	+·1	+·4	− ·1
Apr. 10	1833	...	3−0·2	5+0·7	...	...	...	8·7	0	+·4	− ·5
May 5	1858	...	5−1·5	8−0·7	9−0·7	13−0 5	15+0·5	10·8	−·1	+·3	+ ·2
May 25	1878	80	13−2·0	14+0·2	15−1·0	16−0·1	. ...	11·7	−·1	+·4	0

T Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1891 June 9	1893	80	14−0·4	15−1·5	16−1·5	17−0·2	...	12·2	−·2	+·5	− ·2
July 1	1915	80	14−1·0	15−2·0	16−2·0	17−1·0	...	12·8	−·2	+·5	+ ·1
Aug. 14	1959	80	13−2·5	14−0·5	15−1·5	16−1·5	17−0·5	12·3	−·2	+·4	− ·4
Sept. 2	1978	...	13−1·2	14+0·7	15−0·2	=16	17+0·7	11·0	0	+·4	− ·5
Sept. 13	1989	...	9−0·4	13−0·6	15+0·3	16+0·6	17+1·0	10·7	0	+·3	+ ·2
Oct. 4	2010	...	2−1·0	5+1·0	6+0·2	8+2·0	9+2·0	8·7	+·2	+·2	+ ·6
Oct. 24	2030	...	=1	2+0·3	3+1·3	5+2·0	6+1·3	7·6	+·2	+·3	− ·1
Nov. 3	2040	...	1−0·4	2+0·6	3+1·3	5+2·0	6+1·5	7·6	+·2	+·3	− ·2
Nov. 23	2060	...	1−0·3	2+0·3	3+1·5	5+1·8	6+1·3	7·7	+·2	+·3	− ·4
Dec. 4	2071	...	1−1·5	2−1·0	3+1·0	5+1·5	...	8·4	0	+·4	0
Dec. 21	2088	...	2−1·3	3−0·7	5+0·5	6−0·5	9+1·5	9·2	−·1	+·3	+ ·2
1892 Jan. 25	2123	...	5−1·3	8−0·3	=9	=1	16+0·5	10·5	0	+·2	+ ·2
Feb. 8	2137	80	13−1·0	15+0·2	=16	...	...	11·1	0	+·3	+ ·1
Mar. 1	2159	80	11−1·0	14−0·3	15−0·5	16−1·0	17+0·3	11·7	−·1	+·3	− ·5
Mar. 14	2172	80	14−0·7	15−1·3	16−2·0	=17	...	12·3	−·2	+·5	+ ·2
Mar. 28	2186	...	12−1·0	14−0·5	15−0·5	16−1·0	17+0·3	11·8	−·1	+·4	− ·3
Apr. 14	2203	...	12−0·5	14−0·2	=15	16−0·5	17+0·3	11·5	−·1	+·4	− ·3
Apr. 26	2215	...	13−1·3	14+0·5	15+0·5	16+0·5	17+1·0	10·9	+·1	+·4	0
May 17	2236	...	5−0·6	9+0·5	13+0·3	14+2·0	17+2·0	9·8	+·2	+·4	+ ·6
June 2	2252	...	1−1·0	2−1·2	3+0·5	4+0·5	6+1·0	8·5	+·1	+·3	− ·1
June 8	2258	...	1−0·7	2−0·2	3+1·0	4+1·0	6+1·0	8·1	+·1	+·3	− ·1
June 29	2279	...	1+1·3	2+1·3	3+2·0	4+2·0	6+2·0	6·8	+·3	+·3	− ·5
July 8	2288	...	1+1·0	2+1·5	3+2·0	5+2·3	6+2·0	6·8	+·3	+·3	− ·5
July 20	2300	...	1+1·5	2+2·0	3+2·5	4+2·5	6+2·5	6·3	+·3	+·3	−1·0
July 27	2307	...	1+1·0	2+1·3	3+1·6	4+1·6	6+1·6	7·1	+·3	+·3	− ·3
Aug. 4	2315	...	1+0·6	2+1·0	3+1·6	4+1·3	6+1·3	7·3	+·3	+·3	− ·2
Aug. 20	2331	...	1−0·5	=2	=3	4+0·5	6+0·5	8·4	+1	+·3	− ·9
Sept. 5	2347	...	1−0·5	2−0·5	=3	=4	6+0·2	8·7	−·1	+·3	− ·3
Sept. 17	2359	...	5−0·6	6−1·0	8+0·5	13+0·5	15+1·5	9·9	+·1	+·3	+ ·2
Oct. 10	2382	...	13−1·0	14+1·5	15+0·3	16+0·3	17+1·5	10·6	+·1	+·4	− ·2
Oct. 21	2393	...	13−1·3	14+1·0	15−0·5	16−0·5	17+0·3	11·3	0	+·4	+ ·1
Nov. 7	2410	80	13−2·5	14−0·5	15−1·5	16−1·5	=17	12·3	−·2	+·4	+ ·6
Nov. 19	2422	132	14−1·0	15−2·5	16−2·5	17−1·3	...	13·1	−·2	+·5	+1·3
Nov. 26	2429	...	14−0·5	15−2·0	16−2·0	17−0·5	...	12·6	−·2	+·5	+ ·8
Dec. 6	2439	132	14−2·0	15−3·0	16−3·0	17−1·0	...	13·6	−·2	+·5	+1·7
Dec. 12	2445	132	14−1·5	17−1·5	...	...	...	13·1	−·2	+·6	+1·3
1893 Jan. 4	2468	80	*n*−2·0	*o*−2·0	*q*−1·0	*r*−1·0	...	13·4	−·1	−·1	(+ ·9)
Jan. 13	2477	132	*q*−1·5	*r*−1·5	...	...	...	13·8	−·1	−·1	(+1·3)
Jan. 20	2484	80	*m*−2·5	*n*−2·0	*o*−2·0	*q* 1·0	*r* 0·3	13·3	−·1	−·1	+ ·8
Feb. 5	2500	...	{ *l*−0·6 *r*+2·0	*m*−0·3	*n*+1·0	*o*+1·0	*q*+1·3 }	10·8	0	−·1	− ·7

T Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1893 Feb. 14	2509	...	$f-1\cdot3$	$g-1\cdot0$	$h-1\cdot0$	$k+0\cdot5$	$l+1\cdot5$	9·6	0	+·1	+·2
Feb. 28	2523	...	$e-0\cdot3$	$f-1\cdot0$	$g+0\cdot6$	$h+1\cdot0$	$k+1\cdot0$	8·5	0	0	+·2
Mar. 8	2531	...	$e-1\cdot0$	$f-0\cdot5$	$g+1\cdot0$	$h+1\cdot0$	$k+2\cdot0$	8·3	0	0	+·1
Mar. 16	2539	...	$e-0\cdot5$	$f+0\cdot3$	$g+1\cdot2$	$h+1\cdot2$	$k+1\cdot7$	8·0	+·1	0	+·1
Mar. 22	2545	...	$=e$	$f-0\cdot2$	$g+1\cdot0$	$h+1\cdot0$	$k+1\cdot6$	8 1	+·1	0	+·2
Apr. 4	2558	...	$e-0\cdot3$	$f+0\cdot3$	$g+1\cdot0$	$h+1\cdot5$	$k+2\cdot0$	7·9	+·1	0	−·1
Apr. 13	2567	...	$e-1\cdot0$	$f-0\cdot3$	$g+1\cdot0$	$h+1\cdot0$	$k+1\cdot5$	8·4	0	0	(+·1)
Apr. 26	2580	...	$e-0\cdot5$	$f-0\cdot3$	$g+1\cdot0$	$h+1\cdot0$	$k+1\cdot5$	8·3	0	0	(−·4)
May 8	2592	...	$e-0\cdot5$	$f-0\cdot7$	$g+0\cdot7$	$h+0\cdot5$	$k+1\,5$	8 5	0	0	(−·7)
May 21	2605	...	$f-1\cdot2$	$g-0\cdot5$	$h-0\cdot3$	$k+0\cdot5$	$l+2\cdot0$	9·2	0	+·1	(−·5)
June 2	2617	...	$f-1\cdot5$	$h-1\cdot3$	$=k$	$l+1\cdot0$	$m+1\cdot0$	9·9	0	0	(−·5)
June 30	2645	...	$k-2\cdot0$	$l-1\cdot0$	$m-1\cdot3$	$=n$	$o-0\cdot5$	11·8	−·1	0	0
July 17	2662	...	$m-3\cdot0$	$n-1\cdot0$	$o-2\cdot0$	$q+0\cdot5$	$=r$	12·8	0	−·1	+·3
Aug. 8	2684	80	$n-2\cdot5$	$o-2\cdot5$	$q-1\cdot0$	$r-1\cdot0$	...	13·7	−·1	−·1	+·9
Aug. 21	2697	80	$n-2\cdot0$	$o-2\cdot0$	$=q$	$r-1\cdot0$	...	13·1	−·1	−·1	+·2
Sept. 4	2711	80	$n-1\cdot5$	$o-2\cdot0$	$q-1\cdot0$	$r-1\cdot3$	...	13·4	−·1	−·1	+·5
Oct. 3	2740	...	$m-1\cdot5$	$n-1\cdot0$	$o-1\cdot0$	$q+0\cdot7$	$r-0\cdot3$	12·3	−·1	−·1	−·2
Oct. 18	2755	...	$m-0\cdot5$	$n+0\cdot6$	$o+0\cdot2$	$q+1\cdot2$	$r+1\cdot0$	11·2	+·1	−·1	+·2
Oct. 31	2768	...	$g-1\cdot0$	$h-0\cdot5$	$k+0\cdot3$	$l+1\cdot3$	$m+1\cdot3$	9·5	0	+·1	−·1
Nov. 9	2777	...	$f-1\cdot3$	$g-0\cdot6$	$h-0\cdot2$	$k+1\cdot0$	$l+2\cdot0$	9·1	0	+·1	+·3
Nov. 22	2790	...	$e-1\cdot0$	$f-0\cdot5$	$g+1\cdot3$	$h+1\cdot5$	$k+2\cdot0$	8·1	0	0	−·3
Dec. 10	2808	...	$f-0\cdot2$	$g+1\cdot0$	$h+1\cdot0$	$k+1\cdot3$	...	8·2	−·1	0	+·1
Dec. 21	2819	...	$e+0\cdot3$	$f+1\cdot0$	$g+1\cdot3$	$h+1\cdot3$	$k+1\cdot5$	7·7	+·2	0	−·1
1894 Jan. 12	2841	...	$e-1\cdot0$	$f+0\cdot6$	$g+1\cdot0$	$h+1\cdot0$	$k+2\cdot3$	8 0	+·1	0	−·2
Jan. 23	2852	...	$e-0\cdot3$	$f-0\cdot5$	$g+1\cdot0$	$h+1\cdot0$	$k+1\cdot5$	8 3	0	0	−·5
Feb. 8	2868	...	$\left\{\begin{matrix}e-2\cdot0\\m+1\cdot5\end{matrix}\right.$	$g-1\cdot0$	$h-1\,0$	$k+1\cdot0$	$l+1\cdot5\}$	9·5	0	0	−·3
Feb. 21	2881	...	$g-1\cdot0$	$k-1\cdot0$	$l+0\cdot5$	$m+0\cdot5$	$q+2\cdot0$	10·4	0	+·1	+·1
Mar. 4	2892	...	$k-1\cdot3$	$l-0\cdot7$	$=m$	$n+0\cdot7$	$q+1\cdot0$	11·0	0	0	−·1
Mar. 15	2903	...	$m-1\cdot0$	$=n$	$o+0\cdot5$	$q+1\cdot0$	$r+1\cdot0$	11·4	0	−·1	−·1
Mar. 25	2913	...	$m-1\cdot0$	$n-0\cdot5$	$=o$	$=q$	$r+1\cdot0$	11·8	0	−·1	−·1
Apr. 25	2944	...	$n-2\cdot0$	$o-1\cdot0$	$q-1\cdot0$	$=r$	...	12·9	−·1	−·1	+·1
May 9	2958	...	$l-3\cdot0$	$n-2\cdot0$	$o-2\cdot0$	$q-0\cdot5$	$r-0\cdot5$	13·2	−·1	0	+·4
May 20	2969	80	$n-2\cdot0$	$o-2\cdot5$	$=q$	$r-0\cdot5$	...	13·1	−·1	−·1	+·3
June 9	2989	80	$\left\{\begin{matrix}l-2\cdot0\\r+0\cdot5\end{matrix}\right.$	$m-2\cdot0$	$n-1\cdot3$	$o-1\cdot3$	$q+1\cdot0\}$	12·6	0	0	+·6
June 18	2998	80	$l-1\cdot5$	$m-1\cdot5$	$n-1\cdot0$	$q+1\cdot0$	$r+0\cdot7$	12·0	0	0	+·3
July 3	3013	...	$g-1\cdot5$	$h-1\,0$	$l-0\cdot5$	$=m$	...	10·5	−·1	+·1	−·4
July 19	3029	...	$e+0\cdot5$	$f+1\cdot2$	$g+1\cdot2$	$h+1\cdot5$	$l+2\cdot0$	7·6	+·2	0	−·3
Aug. 18	3059	...	$e+0\,7$	$f+1\cdot0$	$g+1\cdot6$	$h+1\cdot3$	$k+2\cdot0$	7·5	+·2	0	+·5
Aug. 31	3072	...	$e+0\cdot5$	$f+1\cdot0$	$g+1\cdot3$	$h+1\cdot3$	$k+1\cdot5$	7·7	+·2	0	+·4
Sept. 14	3086	...	$e+1\cdot0$	$f+1\cdot0$	$h+1\cdot5$	$k+2\cdot0$	$m+2\cdot5$	7·6	+·2	0	−·1
Sept. 26	3098	...	$e+1\cdot0$	$f+1\cdot0$	$h+1\cdot5$	$k+2\cdot0$	$m+3\cdot0$	7·5	+·2	0	−·7
Oct. 8	3110	...	$e-0\cdot5$	$=f$	$g+0\cdot4$	$h+1\cdot0$	$k+1\cdot3$	8·4	+·1	0	−·4
Oct. 22	3124	...	$e-1\cdot3$	$=g$	$=h$	$k+1\cdot0$	$l+1\cdot5$	9·0	0	+·1	−·4
Oct. 29	3131	...	$e-1\cdot$	$f-1\cdot3$	$=h$	$k+0\cdot5$	$l+1\cdot0$	9·3	0	0	−·7
Nov. 19	3152	...	$l-0\cdot5$	$m-0\cdot5$	$n+1\cdot0$	$q+2\cdot0$	$r+2\,0$	10·7	0	0	−·3

T Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1894 Nov. 30	3163	...	$l-1\cdot0$	$m-0\cdot5$	$=o$	$q+1\cdot0$	$r+1\cdot0$	11·4	0	−·1	− ·1
Dec. 15	3178	80	$m-2\cdot3$	$n-1\cdot0$	$o-1\cdot0$	$q+0\cdot5$	$=r$	12·5	0	−·1	+ ·4
Dec. 27	3190	80	$l-2\cdot5$	$n-2\cdot0$	$o-1\cdot0$	$q-0\cdot5$	$=r$	12·8	−·1	0	+ ·5
1895 Jan. 17	3211	132	$q-1\cdot0$	$r-0\cdot5$	...	...	...	13·1	−·1	−·1	(+ ·7)
Jan. 26	3220	80	$m-3\cdot0$	$n-2\cdot0$	$o-1\cdot0$	$q-1\cdot0$	$r-0\cdot5$	13·2	−·1	−·1	(+1·1)
Feb. 16	3241	...	$m-3\cdot0$	$n-2\cdot0$	$o-1\cdot0$	$q-0\cdot5$	$r+0\cdot3$	12·9	−·1	−·1	(+2·0)
Mar. 1	3254	...	$m-1\cdot0$	$=n$	$o+0\cdot5$	$q+0\cdot3$	$r+1\cdot0$	11·5	0	−·1	(+1·5)
Mar. 17	3270	...	$g-1\cdot3$	$h-1\cdot3$	$k-0\cdot4$	$l+0\cdot3$	$m+0\cdot3$	10·3	0	+·1	(+1·4)
Mar. 25	3278	...	$f-1\cdot5$	$g-1\cdot0$	$h-0\cdot3$	$k+1\cdot0$	$l+2\cdot0$	9·3	0	+·1	(+ ·9)
Apr. 10	3294	...	$e-0\cdot5$	$f+1\cdot0$	$g+1\cdot0$	$h+1\cdot0$	$k+2\cdot0$	7·9	+·1	0	(− ·2)
Apr. 29	3313	...	$e-0\cdot2$	$f+0\cdot8$	$g+1\cdot3$	$h+1\cdot3$	$k+1\cdot6$	7·8	+·1	0	− ·3
May 6	3320	...	$e+0\cdot3$	$f+0\cdot6$	$g+1\cdot4$	$h+1\cdot4$	$k+2\cdot3$	7·6	+·2	0	− ·4
May 14	3328	...	$e+0\cdot3$	$f+0\cdot3$	$g+1\cdot3$	$h+1\cdot3$	$k+2\cdot0$	7·8	+·2	0	− ·3
May 29	3343	...	$e-1\cdot0$	$f-1\cdot0$	$g+0\cdot7$	$h+1\cdot3$	$k+1\cdot3$	8·5	0	0	− ·1
June 24	3369	...	$f-1\cdot3$	$=h$	$k+0\cdot3$	$l+0\cdot6$	$m+1\cdot0$	9·6	+·1	0	− ·2
July 12	3387	...	$g-1\cdot3$	$h-1\cdot3$	$k-1\cdot0$	$l+0\cdot2$	$m-0\cdot2$	10·5	−·1	+·1	− ·4
Aug. 6	3412	80	$k-1\cdot5$	$l-1\cdot0$	$m-1\cdot0$	$q+1\cdot0$	...	11·4	0	0	− ·6
Aug. 27	3433	80	$m-2\cdot0$	$n-2\cdot0$	$o-2\cdot0$	$q-0\cdot5$	$r-0\cdot5$	13·1	−·1	−·1	(+ ·7)
Sept. 8	3445	80	$n-1\cdot5$	$o-2\cdot0$	$q-1\cdot0$	$r-0\cdot5$	...	13·1	−·1	−·1	(+ ·8)
Sept. 21	3458	80	$l-3\cdot0$	$n-2\cdot0$	$o-3\cdot0$	$q-1\cdot2$	$r-1\cdot2$	13·7	−·1	0	(+1·8)
Oct. 14	3481	80	$q-0\cdot5$	$r-0\cdot5$	...	...	...	12·8	−·1	−·1	(+1·7)
Oct. 25	3492	80	$m-1\cdot0$	$=n$	$o-1\cdot0$	$q+0\cdot7$	$r+0\cdot7$	11·8	0	−·1	(+1·5)
Oct. 27	3494	...	$k-1\cdot5$	$l-0\cdot5$	$m-1\cdot0$	$q+1\cdot0$	$r+1\cdot0$	11·3	0	0	(+1·4)
Nov. 9	3507	...	$k-2\cdot0$	$l-0\cdot4$	$m-0\cdot2$	$q+1\cdot0$	$r+1\cdot0$	11·2	0	0	(+2·1)
Nov. 17	3515	...	$k-1\cdot0$	$l-0\cdot3$	$m-0\cdot3$	$q+1\cdot3$	$r+1\cdot3$	10·9	0	0	(+2·1)
Nov. 30	3528	...	$f-1\cdot3$	$g+0\cdot5$	$h+1\cdot0$	$l+2\cdot0$	$m+2\cdot0$	8·7	+·1	+·1	+ ·8
Dec. 10	3538	...	$e-0\cdot3$	$f+0\cdot6$	$g+1\cdot0$	$h+1\cdot0$	$k+1\cdot7$	8·0	+·1	0	+ ·4
1896 Jan. 4	3563	...	$e+0\cdot7$	$f+0\cdot7$	$g+1\cdot3$	$h+1\cdot3$	$k+2\cdot0$	7·6	+·2	0	+ ·6
Jan. 15	3574	...	$e+1\cdot0$	$f+1\cdot5$	$g+1\cdot5$	$h+2\cdot0$	$k+2\cdot5$	7·1	+·2	0	0
Jan. 19	3578	...	$e+0\cdot7$	$f+1\cdot0$	$g+1\cdot3$	$h+1\cdot3$	$k+2\cdot0$	7·5	+·2	0	+ ·3
Feb. 4	3594	...	$e+0\cdot3$	$f+0\cdot3$	$g+1\cdot3$	$h+1\cdot3$	$k+1\cdot6$	7·8	+·2	0	0
Feb. 20	3610	...	$e-1\cdot0$	$f-0\cdot2$	$=g$	$h+0\cdot5$	$k+1\cdot0$	8·7	0	0	+ ·1
Mar. 4	3623	...	$e-2\cdot0$	$f-1\cdot3$	$=h$	$k+1\cdot0$	$m+2\cdot0$	9·3	0	0	+ ·1
Apr. 5	3655	...	$h-2\cdot0$	$k-1\cdot0$	$l-0\cdot5$	$m-0\cdot2$	$q+1\cdot0$	11·0	−·1	0	+ ·2
Apr. 21	3671	80	$n-1\cdot0$	$o-1\cdot0$	$=q$	$r+1\cdot0$	...	12·2	0	−·1	+ ·3
May 1	3681	132	$q-0\cdot5$	$r-0\cdot3$	...	...	...	12·7	−·1	−·1	+ ·2
May 12	3692	...	$n-1\cdot0$	$o-1\cdot3$	$q-0\cdot6$	$r-0\cdot6$	...	12·8	−·1	−·1	+ ·2
May 26	3706	80	$n-1\cdot0$	$o-2\cdot0$	$q-0\cdot5$	$r-1\cdot0$	...	13·0	−·1	−·1	+ ·2
June 17	3728	...	$m-3\cdot0$	$n-2\cdot0$	$o-2\cdot5$	$q-1\cdot5$	$r-1\cdot5$	13·8	−·1	−·1	+ ·9
June 29	3740	80	$l-3\cdot0$	$n-2\cdot0$	$o-2\cdot0$	$q-1\cdot0$	$r-1\cdot0$	13·4	−·1	0	+ ·6
July 11	3752	80	$=q$	$=r$	...	...	...	12·3	0	−·1	− ·4
July 22	3763	80	$n-2\cdot0$	$o-2\cdot0$	$=q$	$=r$	...	12·9	0	−·1	+ ·4
Aug. 6	3778	...	$l-1\cdot3$	$m-1\cdot3$	$=n$	$q+1\cdot0$	$r+1\cdot0$	11·6	0	0	+ ·2
Aug. 18	3790	...	$g-1\cdot0$	$h-0\cdot3$	$k-0\cdot2$	$l+1\cdot0$	$m+1\cdot0$	9·7	0	+·1	+ ·2
Sept. 10	3813	...	$e-0\cdot7$	$f-0\cdot3$	$h+1\cdot0$	$k+1\cdot3$	$l+2\cdot0$	8·4	0	0	+ ·4
Sept. 26	3829	...	$=e$	$f+0\cdot7$	$g+1\cdot0$	$h+1\cdot0$	$k+1\cdot7$	7·9	+	0	+ ·3

T URSÆ MAJORIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		G.M.T.
									Scale.	Stars.	
											h m
1900 Apr. 26	5136	...	$e-1\cdot0$	$f+0\cdot3$	$g+1\cdot5$	$h+1\cdot5$	$k+2\cdot2$	7·9	+·2	0	10 0
May 24	5164	...	$e-1\cdot7$	$f-1\cdot2$	$g-0\cdot3$	$h-0\cdot6$	$k+1\cdot0$	9·4	−·2	0	9 20
June 17	5188	...	$=l$	$m-0\cdot2$	$=n$	$=o$	$r+1\cdot0$	11·2	0	0	10 40
July 7	5208	80	$k-2\cdot0$	$l-1\cdot3$	$m-1\cdot0$	$q+1\cdot0$	$r+1\cdot0$	11·6	0	0	10 30
July 17	5218	80	$k-3\cdot0$	$l-2\cdot0$	$m-2\cdot0$	$q+0\cdot2$	$r+0\cdot5$	12·4	0	0	9 30
Aug. 14	5246	80	$k-3\cdot0$	$l-2\cdot0$	$m-2\cdot0$	$q-1\cdot0$	$r-1\cdot0$	12·9	−·2	0	9 40
Aug. 18	5250	132	$l-2\cdot5$	$m-2\cdot0$	$q-1\cdot2$	$r-1\cdot0$	...	13·2	−·2	0	9 50
Aug. 30	5262	132	$l-2\cdot0$	$n-1\cdot0$	$o-1\cdot5$	$q-1\cdot0$	$r-1\cdot0$	12·9	−·2	0	8 40
Sept. 13	5276	80	$l-1\cdot5$	$n-1\cdot0$	$o-1\cdot0$	$=q$	$r-0\cdot6$	12·4	−·2	0	8 30
Sept. 19	5282	80	$k-3\cdot0$	$l-1\cdot0$	$m-1\cdot5$	$q-0\cdot3$	$r-0\cdot7$	12·4	−·2	0	7 40
Sept. 30	5293	...	$h-2\cdot3$	$k-2\cdot0$	$l-1\cdot0$	$m-1\cdot0$	$q+1\cdot0$	11·6	−·1	0	9 50
Oct. 8	5301	...	$g-2\cdot0$	$h-1\cdot5$	$k-1\cdot0$	$=l$	$=m$	10·7	−·1	+·1	7 50
Oct. 17	5310	...	$g-1\cdot5$	$h-1\cdot0$	$k-1\cdot0$	$l+0\cdot7$	$m+1\cdot0$	10·2	+0	+·1	8 0
Oct. 26	5319	...	$e-1\cdot5$	$f-1\cdot0$	$g+0\cdot7$	$k+2\cdot0$	$m+2\cdot5$	8·6	+·1	0	9 30
Nov. 13	5337	...	$e+1\cdot0$	$f+1\cdot3$	$g+2\cdot0$	$h+2\cdot5$	$k+3\cdot0$	6·8	+·3	0	7 30
Nov. 22	5346	...	$e+1\cdot5$	$f+2\cdot0$	$g+2\cdot5$	$h+2\cdot5$	$m+4\cdot0$	6·5	+·3	0	7 0
Nov. 29	5353	...	$e+1\cdot0$	$f+1\cdot5$	$g+2\cdot0$	$h+2\cdot0$	$k+3\cdot0$	6·9	+·3	0	7 10
Dec. 5	5359	...	$e+1\cdot8$	$f+1\cdot8$	$g+2\cdot5$	$h+2\cdot8$	$k+3\cdot5$	6·3	+·3	0	8 15
Dec. 13	5367	...	$e+1\cdot3$	$f+1\cdot3$	$g+1\cdot9$	$h+2\cdot0$	$k+2\cdot5$	7·0	+·3	0	5 50
Dec. 19	5373	...	$e-0\cdot5$	$f-0\cdot5$	$g+2\cdot0$	$h+2\cdot3$	$k+2\cdot0$	7·7	+·1	0	7 30
Dec. 28	5382	...	$e+0\cdot4$	$f+0\cdot6$	$g+1\cdot5$	$h+1\cdot8$	$k+2\cdot5$	7·4	+·3	0	6 10

S Ursæ Majoris.

R. A. $12^h\ 39^m\ 34^s$. Dec. + 61° 38′·4 (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1887 Feb. 21	0324	...	2−1·0	3−1·3	4+1·0	5+1·5	...	7·9	0	−·1	...
Mar. 27	0358	...	1−1·5	2−1·0	3−1·0	4+1·5	5+2·0	7·6	−·1	0	...
Apr. 11	0373	...	1−2·0	3−1·5	4+0·5	...	...	8·2	−·1	0	...
Apr. 25	0387	...	=4	5+0·5	...	...	...	8·5	+·2	0	...
May 16	0408	...	4−1·0	5−0·2	...	...	...	9·4	−·3	0	...
June 8	0431	...	6−1·0	8+0·5	9+0·5	12+1·0	=13	10·0	+·1	0	...
June 16	0439	...	{=12 17−1·0}	=13	14−1·0	15−1·0	16−1·0}	10·9	−·1	+·1	...
June 30	0453	...	{=12 17−1·0}	13−0·6	14−1·0	15−1·0	16−1·0}	11·0	−·2	+·1	...
July 15	0468	...	12−0·5	13−1·0	15−1·0	16−1·0	17−1·0	11·1	−·2	+·2	...
Aug. 4	0488	80	{=12 17−1·5}	13−1·0	14−1·5	15−1·5	16−1·5}	11·4	−·2	+·1	..
Aug. 13	0497	...	10+0·2	=11	12+0·2	13−1·5	...	10·9	+·1	0	...
Sept. 10	0525	...	1−2·0	2−1·3	3−1·3	=4	5+0·7	8·4	−·1	0	...
Sept. 22	0537	...	1−2·0	2−0·8	3−1·0	4+1·0	5+1·5	7·9	−·1	0	...
Oct. 13	0558	...	1−2·0	2−1·0	3−1·5	4+1·0	5+1·0	8·1	−·1	0	...
Oct. 23	0568	...	1−2·0	2−1·0	3−1·3	4+1·5	5+2·0	7·7	−·1	0	...
Nov. 1	0577	...	2−0·5	3−0·8	4+1·5	5+1·5	6+2·0	7·5	+·1	−·1	...
Nov. 20	0596	...	2−1·8	3−2·0	4+1·0	5+1·0	6+2·0	8·2	+·1	−·1	...
Nov. 29	0605	...	2−1·7	3−2·0	4+0·5	5+0·7	6+1·0	8·5	+·1	−·1	...
Dec. 7	0613	...	=4	5+0·3	=6	7+1·5	...	8·7	+·2	0	...
Dec. 22	0628	...	4−1·0	5−0·5	10+1·5	11+1·0	12+2·0	9·4	+·1	0	...
1888 Jan. 14	0651	...	12+0·6	13+0·3	=15	16+0·3	...	9·9	+·2	+·2	...
Feb. 4	0672	...	12−0·5	...	...	...	...	11·4	−·2	0	...
Feb. 12	0680	...	10−1·0	11−1·2	12−0·2	13−1·0	...	11·5	−·2	0	...
Feb. 14	0682	80	10−2·0	11−2·3	12−0·3	14−1·0	...	12·0	−·2	−·1	...
Feb. 17	0685	80	12−1·0	...	...	...	...	11·9	−·2	0	...
Feb. 29	0697	80	12−1·0	13−1·5	...	...	...	11·8	−·2	+·1	...
Mar. 21	0718	...	1−2·0	3−1·0	=4	=7	...	8·7	−·2	0	...
Apr. 10	0738	...	2−1·5	3−2·0	5+0·2	=6	...	8·9	−·1	0	...
Apr. 26	0754	...	1−3·0	2−1·5	3−2·0	5+0·5	...	8·8	−·2	0	...
May 12	0770	...	2−1·0	3−1·7	5+1·0	6+1·5	11+2·5	8·1	+·1	−·1	..
May 23	0781	...	1−2·5	2−1·3	3−1·5	4−1·0	5+1·3	8·6	−·2	0	...
June 9	0798	...	1−2·0	2−1·0	3−1·0	5+1·0	6+1·5	8·0	−·1	0	...
June 27	0816	...	1−3·0	2−1·5	3−2·0	5+1·0	6+0·5	8·7	−·1	0	...
July 11	0830	...	2−1·7	3−2·0	5+1·0	6+0·7	7+2·0	8·5	+·1	0	...
July 28	0847	...	5−1·0	6+1·0	7+0·5	8+1·0	9+1·0	9·3	+·2	0	...
Aug. 14	0864	...	10+0·8	11+0·5	12+1·0	=13	=15	9·9	+·2	+·1	...
Aug. 30	0880	...	10−1·0	11−1·0	12−0·5	13−1·0	15−2·0	11·5	−·2	+·1	...
Sept. 6	0887	...	10−1·7	11−2·0	12−0·5	13−1·5	...	12·0	−·2	0	...
Sept. 14	0895	...	10−1·0	11−1·5	12−0·5	13−1·5	...	11·7	−·2	0	...
Sept. 30	0911	...	10−2·0	11−2·0	12−1·0	...	...	12·4	−·2	0	...

S Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1888 Oct. 9	0920	...	8−1·5	9−2·0	10−1·0	11−1·5	12−1·5	12·1	−·2	0	...
Oct. 21	0932	...	10−1·0	11−1·5	12−1·0	13−2·0	...	12·0	−·2	0	...
Oct. 30	0941	...	10−1·0	11−1·0	12−0·5	13−2·0	14−1·0	11·6	−·2	−·1	...
Nov. 22	0964	...	4−0·3 16+1·0	=5	=6	14+1·0	15+1·0	9·1	+·1	0	...
Dec. 9	0981	...	2−2·0	3−2·0	5+0·3	6+1·0	7+2·0	8·6	+·1	0	...
Dec. 29	1001	...	2−1·5	3−2·0	4−0·5	=5	15+2·0	8·7	−·1	−·1	...
1889 Jan. 7	1010	...	2−1·0	3−1·5	4+0·5	5+1·0	6+1·0	8·2	+·1	−·1	...
Feb. 4	1038	...	1−2·0 6+2·0	=2	3−0·5	4+1·0	5+2·0	7·4	+·1	0	...
Feb. 15	1049	...	1−2·0	2−0·3	3−1·0	4+1·0	5+1·5	7·8	−·1	0	...
Mar. 1	1063	...	2−1·0	3−1·3	4+0·3	5+1·0	6+1·5	8·1	+·1	−·1	...
Mar. 13	1075	...	2−1·5	3−2·0	=4	5+0·7	...	8·7	−·1	−·1	...
Mar. 22	1084	...	4−1·0 16+2·0	5−0·2	=6	14+2·0	15+1·5	8·8	+·1	0	−·5
Apr. 10	1103	...	=10 16−1·5	11−0·3	12+0·5	13−0·6	15−1·5	11·0	+·1	+·2	+·9
Apr. 21	1114	...	10−1·7	11−2·0	12+0·5	13−1·0	...	11·7	−·1	0	+·7
May 10	1133	80	10−2·0	11−2·0	12−1·3	13−2·3	18−0·5	12·2	−·2	0	+·4
May 22	1145	...	12−1·5	13−2·0	22−1·0	23−1·0	=28	12·3	−·2	0	+·3
June 5	1159	...	10−1·3	11−1·5	12−0·5	13−1·0	...	11·7	−·2	0	0
June 16	1170	...	10+0·5	11+0·2	12+0·2	13−0·5	14−0·5	10·5	0	0	−·6
June 29	1183	...	5−1·5	6−1·0	11+1·0	12+1·0	13+1·5	9·8	+·1	0	−·2
July 17	1201	...	2−2·5	3−3·0	5+0·1	6+1·0	12+2·0	9·2	+·1	0	+·1
July 29	1213	...	2−2·0	5+0·7	6+0·8	13+2·5	15+1·5	8·4	+·2	+·1	+·1
Aug. 11	1226	...	1−2·0	2−1·2	3−1·2	5+0·5	6+0·5	8·4	−·1	0	+·3
Aug. 28	1243	...	1−2·0	2−0·6	3−1·0	5+1·3	6+1·0	8·0	−·1	0	+·3
Sept. 12	1258	...	1−2·0	2−1·3	3−1·6	5+1·0	6+1·0	8·2	−·1	0	+·6
Sept. 22	1268	...	1−1·5	2−0·5	3−0·5	5+1·0	6+1·5	7·7	−·1	0	0
Oct. 7	1283	...	1−2·5	2−1·0	3−1·5	5+1·0	6+1·2	8·3	−·1	0	+·4
Oct. 19	1295	...	2−1·2	3−1·5	5+0·7	6+0·2	...	8·6	0	0	+·3
Nov. 6	1313	...	5−1·0	6−0·7	11+1·5	15+0·5	16+0·5	9·6	+·1	0	+·4
Nov. 25	1332	...	=10	11−0·5	12+0·3	13−0·3	=21	10·8	0	0	+·6
Dec. 11	1348	...	10−1·0	11−1·3	12+0·3	13−1·0	21−0·5	11·4	−·1	0	+·3
Dec. 22	1359	...	10−1·0	11−1·5	12−0·2	13−1·0	21−0·7	11·6	−·2	0	+·1
1890 Jan. 8	1376	...	10−1·0	11−1·5	12−0·5	18−0·5	21−1·0	11·8	−·2	−·1	+·3
Jan. 25	1393	...	10+0·7	11+0·5	12+0·5	13−0·5	=16	10·3	+·1	+·1	−·1
Feb. 3	1402	...	6−0·5	10+2·0	11+1·5	13+1·0	15+0·7	9·2	+·2	+·1	−·6
Feb. 15	1414	...	5+0·2	=6	10+1·0	11+1·0	...	9·3	+·2	0	0
Feb. 25	1424	...	2−1·3	3−1·0	5+1·0	6+0·7	14+2·0	8·3	+·1	−·1	−·8
Mar. 9	1436	...	2−1·5	3−1·0	5+1·0	6+1·0	16+2·0	8·2	+·1	+·1	−·5
Mar. 19	1446	...	2−0·5	3−1·0	5+1·3	6+1·0	...	7·9	0	−·1	−·9
Mar. 30	1457	...	1−2·3	2−1·0	3−1·5	5+1·5	6+1·0	8·2	−·1	0	−·4
Apr. 8	1466	...	1−2·0	2−0·3	3−1·0	5+1·5	6+1·3	7·8	−·1	0	−·7
Apr. 22	1480	...	1−1·5	2−0·3	3−0·8	5+1·5	6+1·5	7·6	−·1	0	−·8
May 5	1493	...	1−2·0	2−0·5	3−1·0	5+1·3	6+1·5	7·8	−·1	0	−·6
May 14	1502	...	1−2·5	2−1·5	3−1·0	5+1·3	6+1·0	8·2	−·1	0	−·3

S Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1890 May 24	1512	...	3−2·0	5+0·8	6+0·5	10+2·0	11+2·0	8·6	+·2	0	+·1
June 14	1533	...	5−1·0, 16+1·0	6+0·3	10+2 0	11+2·0	15+1·0	9·0	+·2	+·1	−·2
June 26	1545	...	11+1·2	13+1·0	14+0·5	15−0·7	16+0 5	9·7	+·2	0	−·3
July 5	1554	...	10+1·0	12+1·0	13−0·2	16−1·0	17−1·0	10·3	0	+·2	−·1
July 22	1571	...	10−1·0	11−1·0	=12	13−0·6	=21	11·2	−·1	−·1	0
Aug. 13	1593	...	10−0·5	11−0·7	12−1·0	21−0·5	22+0·5	11·6	−·1	−·1	0
Aug. 23	1603	...	10−1·0	12−1·0	18−1·0	21−0·6	22+0·5	11·8	−·1	−·1	+·2
Sept. 5	1616	...	=10	11−0·5	12−0·7	21−1·0	22+1·0	11·4	−·1	−·1	+·1
Sept. 14	1625	...	12+1·0	=13	14−0·2	15−0·5	16−0·2	10·2	−·1	+·1	−·3
Oct. 3	1644	...	5+0·2	6+0·5	10+1·7	11+1·5	16+1·0	8·9	+·3	+·1	+·2
Oct. 14	1655	...	2−1·2	3−1·5	5+1·0	6+1·5	13+2·0	8·1	+·1	0	−·2
Nov. 1	1673	...	1−2·0	2−1·0	3−1·3	5+1·2	6+1·0	8·1	−·1	0	+·1
Nov. 11	1683	...	2−1·0	3−1·3	5+1·5	6+1·5	7+2·5	7·9	+·1	0	+·2
Dec. 13	1715	...	2−1·0	3−1·5	4+1·0	5+1·5	6+2·0	7·8	+·1	−·1	−·1
1891 Jan. 4	1737	...	2−1·5	3−1·5	5+1·0	6+1·0	...	8·4	0	0	0
Jan. 11	1744	...	3−2·0	5+0·3	6+1·0	10+2·0	11+1·5	8·7	+·2	0	+·3
Feb. 5	1769	...	5−2·0	12+1·0	=13	15−1·0	...	10·5	−·1	+·1	+·9
Feb. 13	1777	...	12+1·0	13−0·2	14−0·5	15−1·0	=16	10·3	−·1	+·1	+·4
Feb. 22	1786	...	10+0·2	11−0·2	12+0·7	13−0·2	=21	10·6	0	−·1	+·2
Mar. 4	1796	...	12−0·3	13−1·0	15−1·5	16−0·8	17−1·0	11·1	−·2	+·2	+·2
Mar. 26	1818	...	12−0·3	13−1·3	17−1·6	18−0·6	21−1·0	11·6	−·2	0	−·2
Apr. 15	1838	...	10−1·7	11−1·3	12−0·2	13−1·0	21−0·7	11·7	−·2	−·1	+·1
May 5	1858	...	5−1·3	6−1·0	15+0·4	16+1·0	17+1·0	9·6	+·1	+·1	−·1
May 25	1878	...	4+0·2	5+0·8	6+1·3	16+2·0	17+2·0	8·0	+·3	+·1	−·2
June 7	1891	...	2−1·5	4+0·3	5+0·8	6+0·7	17+1·5	8·4	+·2	0	+·4
June 20	1904	...	2−1·3	3−1·7	4+0·6	5+1·6	6+1·2	8 2	+·1	−·1	+·1
July 1	1915	...	2−1·5	3−2·0	4+1·2	5+1·6	6+2·0	7·9	+·1	−·1	−·1
July 10	1924	...	2−1·0	3−1·6	4+1·0	5+1·5	6+1·5	7·9	+·1	−·1	−·1
July 26	1940	...	2−1·5	3−1·0	4+1·0	5+1·3	6+1·6	7·9	+·1	−·1	−·1
Aug. 14	1959	...	3−1·5	4+0·5	5+1·0	6+1·0	15+1·5	8·2	+·2	0	0
Sept. 2	1978	...	=4	5+0·6	6+0·4	10+1·5	11+1·8	8·7	+·2	0	0
Sept. 12	1988	...	4−0·3	5+0·3	6−0·6	10+1·8	11+1·0	9·2	+·1	0	−·1
Oct. 4	2010	...	10+0·3	=11	12+0·3	13−1·0	14−1·0	10·8	0	−·1	(−·1)
Oct. 24	2030	...	10−0·3	11−0·7	12−0·4	21−0·3	22+0·7	11·4	−·1	−·1	+·3
Nov. 3	2040	...	10−1·0	11− 1·5	12−0·7	21−1·2	22+0·3	12·0	−·1	−·1	+·9
Nov. 23	2060	...	10−0·5	11−1·3	12−0·5	16−1·5	21−0·5	11·6	−·2	0	+·7
Dec. 4	2071	...	10−0·3	11−1·0	=12	15−1·5	=21	11·3	−·1	−·1	+·9
Dec. 19	2086	...	4−1·3	5−0·5	6−0·8	10+2·0	15+0·3	9·5	−·1	+·1	+·1
1892 Jan. 25	2123	...	4−0·5	5+0·5	6+0·6	13+1·5	14+1·5	8·7	+·2	−·1	+·6
Feb. 8	2137	...	1−2·0	2−1·0	3−1·5	4+1·0	5+1·5	8·0	−·1	0	−·1
Mar. 1	2159	...	1−1·5	2−0·8	3−0 5	4+1·0	5+2·0	7·6	−·1	0	−·3
Mar. 10	2168	...	2−1·2	3−1·5	4+1·5	5+2·0	6+2·0	7·7	+·1	−·1	−·2
Mar. 19	2177	...	2−1·3	3−1·8	4+1·0	5+1·5	6+1·7	8·0	+·1	−·1	−·1
Apr. 7	2196	...	3−1·5	4−0·7	=5	=6	15+1·3	8·9	−·1	0	−·1
Apr. 16	2205	...	5−0·3	6−0·6	12+1·6	13+1·3	15+0·6	9·3	+·1	+·1	+·3
May 17	2236	...	10+0·3	=11	12−0·3	14−1·5	16−1·5	11·1	−·1	0	+·4

S Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1892 June 2	2252	...	10−0·5	11−1·0	12−1·0	13−1·6	21−0·3	11·6	−·2	−·1	+ ·3
June 11	2261	...	10−1·3	11−2·0	12−2·0	14−2·5	21−1·0	12·6	−·2	−·2	+1·0
June 29	2279	...	10−0·6	11−1·0	12−1·0	13−1·3	21−0·3	11·5	− 2	−·1	+ ·1
July 8	2288	...	=10	11−0·2	=12	13−0·5	21+0·5	10·7	0	−·1	− ·2
July 20	2300	...	*f*−1·5	*g*−1·0	*h*−0·5	*k*+0·3	...	9·6	−·2	0	− ·4
Aug. 4	2315	...	*b*−1·6	*c*−1·3	*f*+0·3	*g*+0·6	*h*+1·0	8·4	+·1	+·1	− ·3
Aug. 20	2331	...	*a*−1·5	*b*−1·2	*c*−1·0	=*f*	=*g*	8·3	−·2	+·1	− ·2
Sept. 5	2347	...	*a*−1·5	*b*−1·5	*c*−1·0	=*f*	*g*+0·7	8·3	−·1	+·1	+ ·3
Sept. 14	2356	...	*a*−1·0	*b*−0·7	*c*−0·3	*f*+1·2	*g*+1·5	7·5	−·1	+·1	− ·4
Oct. 4	2376	...	*a*−2·3	*b*−1·0	*c*−0·5	*f*+1·2	*g*+1·2	7·9	−·1	+·1	+ ·1
Oct. 10	2382	...	*a*−1·5	*b*−1·5	*c*−1·0	*f*+1·5	*g*+1·5	7·8	−·1	+·1	0
Oct. 17	2389	...	*a*−1·5	*b*−1·0	*c*−0·3	*f*+1·0	*g*+1·5	7·7	−·1	+·1	− ·2
Oct. 25	2397	...	*a*−1·3	*b*−1·0	*c*−0·5	*f*+1·3	*g*+1·3	7·6	−·1	+·1	− ·5
Nov. 3	2406	...	*b*−1·5	*c*−1·0	*f*+0·5	*g*+1·0	*h*+1·3	8·1	+·1	+·1	0
Nov. 29	2432	...	*f*−1·5	*g*−1·0	*l*+0·5	*m*+1·5	*n*+1·5	9·6	+·1	0	+ ·3
Dec. 12	2445	...	*g*−1·5	*k*−0·3	*l*−0·5	*m*+0·5	*n*+0·5	10·4	0	−·2	+ ·3
Dec. 27	2460	...	*g*−2·5	*k*−1·5	*l*−1·0	*m*+0·3	*n*+0·5	10·9	0	−·2	+ ·3
1893 Jan. 4	2468	80	*k*−2·5	*l*−2·0	=*m*	*n*−1·0	*p*+0·5	11·7	0	−·3	+ ·7
Jan. 13	2477	80	*l*−1·5	=*m*	*n*−0·5	*o*+0·7	*p*+0·7	11·2	0	−·2	0
Jan. 20	2484	80	*k*−1·5	*l*−1·5	*m*−0·3	*n*−0·6	*o*+0·5	11·3	−·1	−·2	− ·1
Feb. 5	2500	...	*l*−1·3	*m*+0·2	*n*−0·2	*o*+1·0	*p*+1·0	11·0	0	−·2	− ·5
Feb. 14	2509	...	*l*−1·0	*m*+0·2	*n*+0·5	*o*+1·0	*p*+1·0	10·8	+·1	−·2	0
Mar. 4	2527	...	*b*−2·0	*g*−0·3	=*h*	*k*+0·2	*m*+1·5	9·2	0	0	− ·7
Mar. 12	2535	...	*f*−1·0	*g*−0·3	*l*+1·0	*m*+1·3	*n*+1·5	9·3	0	0	− ·1
Mar. 22	2545	...	*b*−1·2	*c*−1·0	*f*−0·3	*g*+0·3	*k*+1·0	8·5	0	0	− ·5
Apr. 4	2558	...	*b*−1·5	*c*−1·0	*f*+0·5	*g*+1·0	*l*+2·0	8·2	0	0	− ·3
Apr. 12	2566	...	*a*−2·0	*b*−1·0	*c*−1·5	*f*+0·7	*g*+0·7	8·2	0	+·1	0
Apr. 26	2580	...	*a*−2·0	*b*−1·5	*c*−0·7	*f*+1·0	*g*+1·0	8·0	0	+·1	(− ·1)
May 8	2592	...	*a*−2·0	*b*−0·7	=*c*	*f*+1·0	*g*+1·5	7·6	0	+·1	(− ·5)
May 21	2605	...	*a*−1·5	*b*−0·5	*c*−0·8	*f*+1·0	*g*+1·5	7·7	0	+·1	(− ·6)
June 2	2617	...	*a*−1·5	*b*−0·7	*c*−1·0	*f*+1·0	*g*+1·3	7·8	0	+·1	(− ·6)
June 8	2623	...	*a*−2·0	*b*−1·5	*c*−1·0	*f*+0·5	*g*+1·0	8·2	0	+·1	(− ·4)
June 30	2645	...	*f*−1·3	*g*−1·0	*k*+1·0	*l*+1·3	*m*+1·5	9·2	0	0	(− ·1)
July 17	2662	...	*f*−2·0	=*k*	*l*+0·5	*m*+1·3	*n*+1·3	9·8	+·1	−·2	(− ·3)
Aug. 5	2681	...	*k*−2·0	*l*−1·5	*m*−0·5	*n*−0·5	...	11·5	−·1	−·2	+ ·1
Aug. 21	2697	...	*l*−2·0	*m*−1·0	*n*−1·0	*o*+0·8	*p*+1·0	11·5	0	−·2	− ·1
Sept. 4	2711	...	*l*−2·0	*m*−1·3	*n*−1·3	=*o*	*p*−0·5	12·1	−·1	−·2	+ ·4
Sept. 22	2729	...	*k*−2·5	*l*−1·3	*m*−0·3	*n*−0·3	*o*+1·0	11·3	−·1	−·2	0
Oct. 3	2740	...	*g*−1·5	*k*−1·0	*l*−0·5	*m*+0·7	*n*+0·7	10·4	0	−·1	0
Oct. 18	2755	...	*b*−2·0	*f*−1·3	*g*−0·5	*l*+1·0	*m*+1·5	9·3	0	0	0

S Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1893 Oct. 31	2768	...	$b-2\cdot0$	$c-1\cdot4$	$f-0\cdot6$	$g+0\cdot3$	$k+1\cdot3$	8·8	0	0	+·2
Nov. 10	2778	...	$a-2\cdot0$	$b-1\cdot7$	$c-1\cdot3$	$f+1\cdot0$	$g+1\cdot0$	8·2	0	+·1	+·1
Nov. 22	2790	...	$a-1\cdot5$	$b-1\cdot3$	$c-1\cdot0$	$f+0\cdot5$	$g+1\cdot0$	8·1	0	+·1	+·2
Dec. 10	2808	...	$a-1\cdot3$	$b-0\cdot8$	$c-0\cdot5$	$f+1\cdot0$	$g+1\cdot5$	7·6	0	+·1	−·2
Dec. 21	2819	...	$a-1\cdot2$	$b-1\cdot0$	$c-1\cdot0$	$f+1\cdot0$	$g+1\cdot5$	7·7	0	+·1	−·2
1894 Jan. 12	2841	...	$a-2\cdot5$	$b-1\cdot5$	$c-1\cdot0$	$f+1\cdot0$	$g+1\cdot5$	7·9	0	+·1	−·3
Jan. 23	2852	...	$a-1\cdot8$	$b-1\cdot5$	$c-1\cdot0$	$f+1\cdot3$	$g+1\cdot6$	7·9	0	+·1	−·6
Feb. 8	2868	...	$f-1\cdot0$	$g-0\cdot3$	$k+1\cdot3$	$l+1\cdot5$	$m+2\cdot0$	8·8	0	0	−·5
Feb. 21	2881	...	$b-2\cdot0$	$f-1\cdot3$	$l+1\cdot0$	$m+1\cdot5$	$n+1\cdot5$	9·4	0	−·1	−·5
Mar. 4	2892	...	$k-1\cdot0$	$l-0\cdot3$	$m+0\cdot7$	$n+1\cdot0$	$p+2\cdot0$	10·2	0	−·2	−·3
Mar. 15	2903	...	$k-1\cdot3$, $p+1\cdot8$	$l-1\cdot0$	$=m$	$n+0\cdot5$	$o+1\cdot5$	10·5	0	−·2	−·5
Mar. 25	2913	...	$l-1\cdot0$	$=m$	$n-0\cdot3$	$o+0\cdot5$	$p+1\cdot0$	11·1	0	−·2	−·1
Apr. 25	2944	...	$l-1\cdot0$	$m-0\cdot3$	$=n$	$=o$	$p+0\cdot5$	11·3	0	−·2	+·1
May 9	2958	...	$k-2\cdot0$	$l-1\cdot0$	$=m$	$o+1\cdot3$	$p+1\cdot3$	10·9	0	−·2	0
May 20	2969	...	$b-2\cdot0$	$g-1\cdot2$	$k-0\cdot5$	$l+1\cdot0$	$m+1\cdot2$	9·5	0	0	−·6
June 9	2989	...	$c-1\cdot3$	$f-0\cdot3$	$g+0\cdot5$	$l+1\cdot0$	$m+2\cdot0$	8·7	0	0	−·3
June 18	2998	...	$b-1\cdot5$	$c-1\cdot2$	$f-0\cdot5$	$l+1\cdot3$	$m+2\cdot0$	8·7	0	0	+·2
July 2	3012	...	$a-1\cdot5$	$b-1\cdot3$	$c-1\cdot0$	$f-0\cdot3$	$g+0\cdot4$	8·3	−·1	+·1	+·1
July 19	3029	...	$a-1\cdot5$	$b-1\cdot2$	$c-0\cdot8$	$f+0\cdot7$	$g+1\cdot2$	7·9	0	+·1	0
Aug. 18	3059	...	$b-1\cdot0$	$c-1\cdot0$	$f+1\cdot0$	$g+1\cdot0$	$k+2\cdot0$	7·9	0	0	+·1
Aug. 31	3072	...	$a-1\cdot2$	$c-1\cdot0$	$f+0\cdot5$	$g+0\cdot5$	$k+2\cdot0$	8·0	0	0	+·1
Sept. 14	3086	...	$a-1\cdot6$	$b-1\cdot2$	$c-1\cdot2$	$f+0\cdot3$	$g+0\cdot6$	8·2	0	+·1	0
Sept. 26	3098	...	$b-2\cdot0$	$f-1\cdot0$	$g-0\cdot3$	$l+0\cdot5$	$m+1\cdot0$	9·4	0	0	+·4
Oct. 8	3110	...	$f-1\cdot3$	$g-0\cdot7$	$k-0\cdot5$	$l-0\cdot5$	$m+1\cdot0$	9·9	−·1	0	0
Oct. 29	3131	...	$l-1\cdot0$	$m-0\cdot5$	$n-0\cdot3$	$o+1\cdot0$	$p+1\cdot0$	11·1	0	−·2	+·2
Nov. 19	3152	...	$l-2\cdot0$	$m-1\cdot0$	$n-1\cdot0$	$o-0\cdot3$	$r-0\cdot3$	12·2	−·1	−·2	+·4
Nov. 25	3158	...	$l-2\cdot5$	$m-1\cdot5$	$n-1\cdot5$	$o-0\cdot2$	$p-0\cdot2$	12·3	−·1	−·2	+·5
Nov. 30	3163	80	$m-1\cdot0$	$n-2\cdot0$	$=o$	$=p$	...	12·1	−·1	−·2	+·3
Dec. 15	3178	80	$l-2\cdot3$	$m-1\cdot3$	$n-1\cdot0$	$=o$	$=p$	12·0	−·1	−·2	+·5
Dec. 27	3190	...	$k-0\cdot7$	$l-0\cdot5$	$m+0\cdot5$	$=n$	$o+1\cdot0$	10·5	0	−·2	−·2
1895 Jan. 17	3211	...	$b-2\cdot0$	$f-1\cdot0$	$g-0\cdot3$	$l+1\cdot3$	$m+2\cdot0$	9·0	0	0	−·8
Jan. 26	3220	...	$a-2\cdot0$	$f-0\cdot3$	$g+0\cdot3$	$l+1\cdot2$	$m+2\cdot0$	8·7	0	0	−·7
Feb. 5	3230	...	$b-1\cdot5$	$c-1\cdot0$	$f+1\cdot0$	$g+0\cdot5$	$l+2\cdot0$	8·2	0	0	−·8
Feb. 16	3241	...	$a-2\cdot0$	$b-1\cdot3$	$c-1\cdot3$	$f+0\cdot3$	$g+1\cdot0$	8·3	0	+·1	−·2
Mar. 1	3254	...	$a-1\cdot5$	$b-0\cdot8$	$c-0\cdot3$	$f+1\cdot0$	$g+1\cdot5$	7·6	0	+·1	−·3
Mar. 13	3266	...	$a-1\cdot4$	$b-1\cdot0$	$c-0\cdot5$	$f+1\cdot0$	$g+1\cdot5$	7·7	0	+·1	+·2
Mar. 25	3278	...	$a-1\cdot5$	$b-1\cdot0$	$c-0\cdot5$	$f+1\cdot3$	$g+2\cdot0$	7·5	0	+·1	+·2
Apr. 10	3294	...	$a-1\cdot5$	$b-1\cdot2$	$c-1\cdot0$	$f+0\cdot5$	$g+1\cdot0$	8·0	0	+·1	+·3
Apr. 29	3313	...	$a-2\cdot0$	$b-1\cdot5$	$c-1\cdot5$	$f+0\cdot7$	$g+1\cdot0$	8·3	0	+·1	−·3
May 6	3320	...	$f-0\cdot8$	$g-0\cdot3$	$k+1\cdot0$	$l+1\cdot3$	$m+1\cdot3$	9·0	0	0	0
May 14	3328	...	$b-1\cdot3$, $m+1\cdot5$	$c-1\cdot5$	$f-1\cdot0$	$g-0\cdot5$	$l+1\cdot0$	9·1	−·1	0	−·3
May 29	3343	...	$f-1\cdot5$	$g-1\cdot0$	$k-0\cdot3$	$l+1\cdot0$	$m+1\cdot0$	9·7	0	0	−·2
June 24	3369	...	$f-1\cdot5$	$g-1\cdot5$	$k-1\cdot0$	$=l$	$=m$	10·3	−·1	0	−·6
July 12	3387	...	$f-2\cdot0$	$g-2\cdot0$	$k-1\cdot5$	$l-1\cdot0$	$m-0\cdot5$	10·9	−·1	0	−·4
Aug. 13	3419	...	$k-0\cdot2$	$l-0\cdot2$	$m+1\cdot0$	$n+1\cdot0$	$p+1\cdot3$	10·1	0	−·2	−·4

S Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1895 Aug. 27	3433	...	$f-1\cdot0$	$g-0\cdot2$	$l+0\cdot5$	$m+1\cdot0$	$n+1\cdot0$	9·5	0	$-\cdot1$	0
Sept. 7	3444	...	$f-0\cdot7$	$g-0\cdot2$	$k+1\cdot0$	$l+1\cdot0$	$m+2\cdot0$	8·9	0	0	$+\cdot1$
Sept. 21	3458	...	$f-0\cdot4$	$g+0\cdot3$	$k+1\cdot3$	$m+2\cdot0$	$n+2\cdot0$	8·7	$+\cdot1$	$-\cdot1$	$+\cdot3$
Oct. 4	3471	...	$b-1\cdot5$	$c-1\cdot0$	$f+0\cdot5$	$g+0\cdot5$	$m+2\cdot0$	8·3	0	$+\cdot1$	$+\cdot2$
Oct. 23	3490	...	$a-1\cdot3$	$b-1\cdot0$	$c-0\cdot7$	$f+0\cdot7$	$g+0\cdot7$	7·9	0	$+\cdot1$	$-\cdot1$
Oct. 29	3496	...	$a-1\cdot5$	$b-0\cdot6$	$c-0\cdot3$	$f+1\cdot0$	$g+1\cdot0$	7·7	0	$+\cdot1$	$-\cdot3$
Nov. 9	3507	...	$b-1\cdot0$	$c-1\cdot0$	$f+1\cdot0$	$g+1\cdot0$	$m+2\cdot3$	8·0	0	$+\cdot1$	0
Nov. 17	3515	...	$b-1\cdot0$	$c-0\cdot7$	$f+0\cdot7$	$g+1\cdot0$	$l+2\cdot0$	8·0	0	0	$-\cdot2$
Nov. 30	3528	...	$a-1\cdot3$	$b-1\,0$	$c-0\cdot5$	$f+1\cdot0$	$g+0\cdot6$	7·8	0	$+\cdot1$	$-\cdot4$
Dec. 10	3538	...	$b-1\cdot5$	$c-1\cdot0$	$f+0\cdot5$	$g+1\cdot0$	$l+1\cdot3$	8·3	0	0	$-\cdot4$
1896 Jan. 4	3563	...	$f-0\cdot8$	$g-0\cdot4$	$k+0\cdot3$	$l+1\cdot0$	$m+1\cdot3$	9·2	0	0	$-\cdot4$
Jan. 19	3578	...	$f-1\cdot3$	$g-1\cdot0$	$m+1\cdot0$	$n+1\cdot0$	$o+1\cdot5$	9·9	0	0	$-\cdot2$
Jan. 30	3589	...	$f-2\cdot0$	$g-1\cdot3$	$l-1\cdot0$	$m+0\cdot3$	$n+0\cdot5$	10·5	0	$-\cdot1$	$-\cdot2$
Feb. 4	3594	...	$g-1\cdot3$	$k-1\cdot0$	$l-1\cdot0$	$=m$	$n+0\cdot5$	10·7	0	$-\cdot1$	$-\cdot2$
Feb. 20	3610	...	$g-2\cdot0$	$k-1\cdot0$	$l-1\cdot0$	$=m$	$=n$	10·9	$-\cdot1$	$-\cdot1$	$-\cdot4$
Mar. 4	3623	...	$\{g-2\cdot0$ $=r$	$h-2\cdot3$	$k-1\cdot3$	$l-1\cdot0$	$=m\}$	11·4	$-\cdot1$	0	$+\cdot2$
Mar. 14	3633	...	$f-1\cdot6$	$g-1\cdot3$	$k-0\cdot5$	$=l$	$m+0\cdot7$	10·0	0	0	$-\cdot5$
Apr. 5	3655	...	$f-1\cdot0$	$g-0\cdot3$	$k+1\cdot0$	$l+1\cdot5$	$m+2\cdot0$	8·9	0	0	$-\cdot1$
Apr. 21	3671	...	$a-2\cdot0$	$b-1\cdot6$	$c-1\cdot2$	$f+0\cdot5$	$g+1\cdot0$	8·3	0	$+\cdot1$	0
May 1	3681	...	$a-1\cdot5$	$=f$	$g+0\cdot5$	$l+1\cdot3$	$m+1\cdot6$	8·5	$+\cdot1$	0	$+\cdot5$
May 12	3692	...	$a-1\cdot3$	$b-0\cdot7$	$c-0\cdot5$	$=f$	$g+0\cdot5$	8·0	$-\cdot1$	$+\cdot1$	0
May 21	3701	...	$a-1\cdot5$	$b-1\cdot0$	$f+1\cdot3$	$g+1\cdot7$	$k+1\cdot7$	7·7	0	0	$\cdot2$
June 10	3721	...	$a-1\cdot5$	$b-1\cdot0$	$c-0\cdot5$	$f+1\cdot0$	$g+1\cdot3$	7·7	0	$+\cdot1$	0
June 17	3728	...	$a-1\cdot6$	$b-1\cdot3$	$c-0\cdot7$	$f+1\cdot3$	$g+1\cdot6$	7·7	0	$+\cdot1$	$-\cdot1$
June 24	3735	...	$a-1\cdot3$	$b-1\cdot3$	$c-1\cdot0$	$f+1\cdot0$	$g+1\cdot0$	7·9	0	$+\cdot1$	$+\cdot1$
July 5	3746	...	$b-1\,4$	$c-1\cdot0$	$f+0\cdot5$	$g+1\cdot0$	$m+2\cdot0$	8·3	0	$+\cdot1$	$+\cdot3$
July 22	3763	...	$f-0\cdot5$	$=g$	$k+0\cdot6$	$l+1\cdot3$	$m+2\cdot0$	8·8	$+\cdot1$	0	$+\cdot3$
Aug. 6	3778	...	$f-1\cdot3$	$g-1\cdot3$	$=k$	$l+0\cdot3$	$m+1\cdot2$	9·7	0	0	$+\cdot3$
Aug. 18	3790	...	$g-1\cdot3$	$k-0\cdot6$	$l-0\cdot3$	$m+0\cdot6$	$n+0\cdot6$	10·3	0	$-\cdot1$	$+\cdot2$
Sept. 10	3813	...	$l-1\cdot3$	$m-0\cdot5$	$n-0\cdot5$	$o+0\cdot3$	$p-0\cdot3$	11·6	$-\cdot1$	$-\cdot2$	$-\cdot2$
Sept. 26	3829	...	$l-1\cdot7$	$m-1\cdot0$	$n-1\cdot0$	$o+0\cdot2$	$p+0\cdot2$	11·8	0	$-\cdot2$	$-\cdot9$
Oct. 9	3842	80	$l-2\cdot0$	$m-1\cdot0$	$n-1\cdot0$	$=o$	$p-0\cdot5$	12 0	$-\cdot1$	$-\cdot2$	$-\cdot9$
Oct. 27	3860	...	$g-1\cdot5$	$k-1\cdot2$	$l-1\cdot0$	$=m$	$=n$	10·8	$-\cdot1$	$-\cdot1$	$-1\cdot4$
Nov. 3	3867	...	$g-1\cdot3$	$l-0\cdot5$	$m+0\cdot7$	$o+1\cdot3$	$p+1\cdot3$	10·3	0	$-\cdot1$	$-1\cdot0$
Nov. 16	3880	...	$b-2\cdot0$	$c-2\cdot0$	$g-0\cdot5$	$l+0\cdot3$	$m+1\cdot0$	9·4	0	0	$-\cdot5$
Dec. 7	3901	...	$b-1\cdot7$	$c-1\cdot7$	$g+0\cdot3$	$k+1\cdot0$	$m+2\cdot0$	8·7	0	$-\cdot1$	$-\cdot5$
Dec. 23	3917	...	$b-1\cdot3$	$f-0\cdot5$	$g+0\cdot2$	$l+1\cdot0$	$m+1\cdot5$	8·8	0	0	$+\cdot1$
1897 Jan. 14	3939	...	$a-1\cdot3$	$b-0\cdot7$	$f+0\cdot3$	$l+1\cdot3$	$m+2\cdot0$	8·2	0	0	$-\cdot1$
Jan. 23	3948	...	$a-1\cdot5$	$b-1\cdot0$	$f+1\cdot0$	$l+2\cdot0$	$m+2\cdot5$	7·9	0	0	$-\cdot2$
Feb. 3	3959	...	$a-1\cdot7$	$b-1\cdot0$	$f+1\cdot0$	...	...	8·0	$-\cdot1$	0	$-\cdot1$
Feb. 22	3978	...	$b-0\cdot8$	$c-0\cdot5$	$g+1\cdot3$	$l+1\cdot7$	$m+2\cdot3$	7·9	0	0	$-\cdot2$
Mar. 6	3990	...	$b-1\cdot5$	$c-1\cdot3$	$g+0\cdot3$	$l+1\cdot2$	$m+1\cdot5$	8·7	0	0	$+\cdot2$
Apr. 7	4022	...	$c-2\cdot0$	$f-1\cdot3$	$k-0\cdot5$	$l+0\cdot3$	$m+1\cdot0$	9·8	0	0	$-\cdot2$
Apr. 24	4039	...	$f-2\cdot0$	$l-0\cdot7$	$m+0\cdot3$	$o+1\cdot0$	$p+1\cdot0$	10·7	0	$-\cdot1$	$-\cdot3$
May 1	4046	...	$l-1\cdot0$	$m-0\cdot5$	$o+0\cdot3$	$p+0\cdot3$	...	11·3	0	$-\cdot1$	0
May 18	4063	...	$k-2\cdot5$	$l-1\cdot7$	$m-1\cdot0$	$o-0\cdot5$	$p-1\cdot0$	12·1	0	$-\cdot2$	$+\cdot2$

S Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1897 June 2	4078	...	$k-2\cdot2$	$l-2\cdot0$	$m-1\cdot2$	$=o$	$=p$	11·9	−·1	−·2	−·2
June 12	4088	...	$f-2\cdot0$	$k-1\cdot0$	$l-0\cdot2$	$m+0\cdot8$	...	10·3	0	−·1	−·9
July 13	4119	...	$a-2\cdot0$	$b-1\cdot4$	$c-1\cdot4$	$g+0\cdot3$	$l+1\cdot2$	8·6	0	0	(−·3)
July 29	4135	...	$b-1\cdot5$	$c-1\cdot0$	$g+0\cdot7$	$l+1\cdot2$	$m+2\cdot0$	8·4	0	0	0
Aug. 12	4149	...	$b-1\cdot3$	$c-1\cdot0$	$g+0\cdot7$	$k+1\cdot3$	$l+2\cdot0$	8·3	0	0	(+·2)
Aug. 19	4156	...	$b-1\cdot3$	$c-1\cdot0$	$k+1\cdot2$	$l+1\cdot5$	$m+2\cdot0$	8·4	0	0	(+·3)
Aug. 25	4162	...	$b-1\cdot3$	$c-1\cdot0$	$g+1\cdot3$	$k+1\,6$	$l+1\,6$	8·2	0	0	(+·2)
Sept. 3	4171	...	$b-1\cdot3$	$c-1\cdot0$	$g+1\cdot3$	$k+2\cdot0$	$l+2\cdot0$	8·0	0	0	(+·1)
Sept. 12	4180	...	$b-1\cdot0$	$c-0\,3$	$k+1\cdot7$	$l+2\cdot0$	$m+2\cdot7$	7·9	0	0	0
Sept. 19	4187	...	$a-1\cdot3$	$b-0\cdot7$	$c-0\cdot4$	$g+1\cdot5$	$l+2\cdot0$	7·7	0	0	(−·3)
Sept. 26	4194	...	$b-1\cdot0$	$c-1\cdot3$	$l+1\cdot3$	$m+2\,0$	$n+2\cdot0$	8·6	0	−·1	(+·5)
Oct. 6	4204	...	$b-1\cdot3$	$c-1\cdot0$	$k+1\cdot5$	$l+1\cdot5$	$m+2\cdot0$	8·4	0	0	...
Oct. 20	4218	...	$b-2\cdot3$	$c-2\cdot3$	$l+1\cdot0$	$m+2\cdot0$	$n+2\cdot0$	9·1	0	−·1	...
Nov. 1	4230	...	$c-2\cdot0$	$f-1\cdot0$	$k+0\cdot5$	$=l$	$m+1\cdot0$	9·6	0	0	...
Nov. 6	4235	...	$b-2\cdot3$	$g-1\cdot0$	$=k$	$l+0\cdot7$	$m+1\cdot5$	9·4	0	0	...
Nov. 29	4258	...	$l-1\cdot5$	$m-0\cdot5$	$n-0\cdot5$	$o+1\cdot0$	$p+1\cdot0$	11·2	0	−·2	...
Dec. 12	4271	...	$l-1\cdot5$	$m-0\cdot5$	$=n$	...	...	11·3	−·1	−·2	...
Dec. 24	4283	...	$l-1\cdot7$	$m-1\cdot0$	$n-1\cdot0$	$=o$	$=p$	11·8	−·1	−·2	...
1898 Jan. 10	4300	...	$l-2\cdot0$	$m-1\cdot0$	$n-0\cdot5$	$o+0\cdot3$	$p+0\cdot3$	11 7	0	−·2	...
Feb. 2	4323	...	$b-2\cdot5$	$c-2\cdot0$	$k-0\cdot3$	$l+0\cdot7$	$m-1\cdot3$	10·0	−·2	0	+·1
Feb. 14	4335	...	$b-2\cdot0$	$c-1\cdot3$	$f+1\cdot0$	$l+1\cdot5$	$m+2\cdot0$	8·5	+·1	0	−·2
Feb. 23	4344	...	$b-1\cdot3$	$c-1\cdot0$	$k+2\cdot0$	$l+2\cdot0$	$m+3\cdot0$	8·0	+·1	0	−·4
Mar. 2	4351	...	$b-1\cdot5$	$c-1\cdot0$	$k+1\cdot7$	$l+2\cdot0$	$m+2\cdot5$	8·2	+·1	0	−·1
Mar. 11	4360	...	$b-1\cdot7$	$c-1\cdot2$	$k+1\cdot5$	$l+2\cdot0$	$m+2\cdot7$	8·2	+·1	0	+·2
Mar. 21	4370	...	$b-2\cdot0$	$c-1\cdot0$	$k+1\cdot7$	$l+1\cdot5$	$m+2\cdot3$	8·4	+·1	0	+·5
Apr. 5	4385	...	$b-1\cdot0$	$c-1\cdot3$	$k+1\cdot5$	$l+2\cdot0$	$m+2\cdot5$	8·2	+·1	0	+·4
Apr. 22	4402	...	$b-1\cdot3$	$c-1\cdot0$	$k+2\,0$	$l+2\cdot5$	$m+3\cdot0$	7·9	+·1	0	+·1
May 4	4414	...	$a-2\cdot0$	$b-1\cdot5$	$c-1\cdot0$	$k+1\cdot5$	$l+3\cdot0$	8·1	−·1	0	0
May 26	4436	...	$b-2\cdot0$	$c-1\cdot7$	$g+0\cdot3$	$l+1\cdot0$	...	8·9	0	0	+·4
June 7	4448	...	$b-2\cdot3$	$=g$	$k+1\cdot0$	$l+1\cdot0$	$m+2\cdot0$	8·9	+·1	0	0
June 16	4457	...	$b-2\cdot0$	$g-1\cdot0$	$=k$	$l+1\cdot0$	$m+2\cdot0$	9·2	0	0	−·3
June 26	4467	...	$b-2\cdot3$	$c-2\cdot0$	$g-1\cdot0$	$l+1\cdot0$	$m+1\cdot0$	9·5	−·1	0	...
July 5	4476	...	$b-2\cdot0$	$c-2\cdot0$	$k-1\cdot0$	$=l$	$m+1\cdot0$	9·7	−·1	0	...
July 27	4498	...	$g-2\cdot0$	$k-1\cdot5$	$l-1\cdot4$	$m-1\cdot0$	$n-0\cdot6$	11·4	−·2	−·1	...
Aug. 4	4506	...	$g-2\cdot0$	$k-1\cdot5$	$l-1\cdot3$	$m-0\cdot5$	...	11·1	−·2	0	...
Aug. 20	4522	...	$l-2\cdot0$	$m-1\cdot2$	$n-1\cdot0$	$=o$	$=p$	11·9	−·1	−·2	...
Sept. 1	4534	...	$b-2\cdot5$	$g-1\cdot4$	$k-1\cdot0$	$l-0\cdot3$	$m+0\cdot3$	10·2	−·1	0	...
Sept. 14	4547	...	$b-2\cdot3$	$g-0\,2$	$k+1\cdot0$	$l+1\cdot0$	$m+2\cdot0$	8·9	+·1	0	...
Sept. 20	4553	...	$b-2\cdot3$	$=g$	$k+1\cdot0$	$l+1\cdot3$	$m+2\,0$	8·8	+·1	0	...
Sept. 28	4561	...	$b-2\cdot0$	$c-1\cdot3$	$g+1\cdot3$	$l+1\cdot5$	$m+2\,0$	8·5	+·1	0	+·4
Oct. 9	4572	...	$b-1\cdot5$	$c-1\cdot5$	$g+1\cdot0$	$l+1\cdot7$	$m+2\cdot3$	8·4	+·1	0	+·6
Oct. 23	4586	...	$b-1\cdot0$	$c-0\cdot7$	$g+1\,2$	$l+2\cdot0$	$m+3\cdot0$	7 9	+·1	0	+·3
Nov. 5	4599	...	$a-2\cdot0$	$b-1\cdot3$	$c-1\cdot0$	$l+2\cdot0$	$m+3\cdot0$	8·2	−·1	0	+·5
Nov. 18	4612	...	$b-1\cdot2$	$c-0\cdot7$	$g+1\cdot3$	$l+2\cdot0$	$m+3\cdot0$	7·9	+·1	0	+·4
Dec. 13	4637	...	$b-1\cdot4$	$c-1\,2$	$g+1\cdot0$	$l+2\cdot0$	$m+3\cdot0$	8·1	+·1	0	+·2
Dec. 20	4644	...	$b-1\cdot5$	$c-1\cdot2$	$g+1\cdot2$	$k+1\cdot5$	$l+1\cdot8$	8·2	+·1	0	+·1

S Ursæ Majoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1898 Dec. 29	4653	...	$b-2\cdot0$	$g+1\cdot0$	$k+1\cdot3$	$l+2\cdot0$	$m+3\cdot0$	8·1	+·2	0	−·3
1899 Jan. 14	4669	...	$b-2\cdot0$	$c-2\cdot0$	$=g$	$l+0\cdot5$	$m+1\cdot5$	9·2	0	0	0
Jan. 23	4678	...	$f-1\cdot0$	$g-0\cdot5$	$k+1\cdot0$	$l+1\cdot0$	$m+2\cdot0$	9·0	+·1	0	−·4
Feb. 13	4699	...	$f-2\cdot0$	$g-1\cdot7$	$l-0\cdot6$	$m+0\cdot4$	$=n$	10·6	−·1	−·1	+·2
Feb. 22	4708	...	$f-2\cdot2$	$g-1\cdot5$	$l-0\cdot7$	$m+0\cdot3$	$n+0\cdot3$	10·6	0	−·1	+·1
Feb. 28	4714	...	$g-2\cdot5$	$k-2\cdot0$	$l-1\cdot3$	$m-0\cdot3$	$n-0\cdot3$	11·4	−·2	−·1	+·4
Mar. 9	4723	...	$l-2\cdot0$	$m-0\cdot3$	$n-1\cdot0$	$=o$	$p+0\cdot5$	11·7	−·1	−·2	+·5
Mar. 15	4729	...	$k-2\cdot0$	$l-1\cdot3$	$m-0\cdot7$	$n-0\cdot7$	$=o$	11·5	−·2	−·2	+·1
Apr. 7	4752	...	$g-3\cdot0$	$k-2\cdot0$	$l-2\cdot0$	$m-1\cdot0$	$=o$	11·8	−·2	−·1	+·3
Apr. 19	4764	...	$f-1\cdot7$	$k-0\cdot6$	$=l$	$m+1\cdot0$	$n+1\cdot0$	10·1	0	−·2	−·9
Apr. 26	4771	...	$f-1\cdot3$	$g-1\cdot0$	$k-0\cdot3$	$l+1\cdot0$	$m+1\cdot3$	9·6	0	0	−·6
May 3	4778	...	$f-1\cdot5$	$g-0\cdot7$	$k+0\cdot3$	$l+1\cdot0$	$m+2\cdot0$	9·3	+·1	0	−·2
May 22	4797	...	$b-2\cdot0$	$c-1\cdot5$	$f-0\cdot3$	$g+0\cdot5$	$m+2\cdot5$	8·7	−·1	+·1	0
June 6	4812	...	$b-2\cdot0$	$c-1\cdot5$	$=f$	$l+1\cdot3$	$m+2\cdot0$	8·8	0	0	+·6
June 14	4820	...	$b-1\cdot7$	$f+0\cdot5$	$g+0\cdot8$	$l+1\cdot5$	$m+2\cdot3$	8·3	+·2	0	+·5
June 23	4829	...	$b-1\cdot0$	$c-1\cdot3$	$f+1\cdot3$	$g+1\cdot6$	$l+2\cdot5$	7·8	+·1	0	0
July 3	4839	...	$b-2\cdot0$	$c-1\cdot3$	$g+1\cdot5$	$l+2\cdot5$	$m+3\cdot5$	8·0	+·1	0	+·3
July 7	4843	...	$a-1\cdot0$	$b-0\cdot5$	$c-0\cdot5$	$f+0\cdot5$	$g+0\cdot5$	7·8	−·1	+·1	0
July 8	4844	...	$a-1\cdot5$	$b-1\cdot0$	$c-1\cdot0$	$f+1\cdot3$	$g+1\cdot8$	7·7	−·1	+·1	−·1
July 20	4856	...	$b-1\cdot3$	$c-0\cdot7$	$f+1\cdot3$	$g+2\cdot0$	$k+2\cdot3$	7·6	+·1	0	−·2
July 27	4863	...	$a-2\cdot5$	$b-1\cdot5$	$c-2\cdot0$	$f+1\cdot0$	$g+1\cdot5$	8·3	−·1	+·1	+·4
Aug. 6	4873	...	$b-2\cdot0$	$c-2\cdot0$	$f+0\cdot2$	$g+1\cdot0$	$l+1\cdot3$	8·7	+·1	0	+·4
Aug. 18	4885	...	$f-1\cdot0$	$g+0\cdot2$	$k+1\cdot3$	$l+1\cdot7$	$m+2\cdot5$	8·6	+·2	0	−·2
Sept. 2	4900	...	$f-1\cdot3$	$g-0\cdot6$	$k+0\cdot3$	$l+0\cdot3$	$m+0\cdot7$	9·6	+·1	0	−·1
Sept. 18	4916	...	$f-2\cdot0$	$g-2\cdot0$	$k-1\cdot0$	$=l$	...	10·6	−·2	0	0
Sept. 30	4928	...	$l-1\cdot3$	$m-0\cdot3$	$=n$	$o+0\cdot2$	$=p$	11·4	0	−·2	+·5
Oct. 7	4935	...	$l-2\cdot0$	$m-1\cdot0$	$n-0\cdot5$	$o+0\cdot3$	$=p$	11·7	−·1	−·2	+·5
Oct. 14	4942	...	$k-2\cdot0$	$l-1\cdot2$	$m-0\cdot2$	$=n$	$p+1\cdot0$	11·2	−·1	−·2	−·2
Oct. 30	4958	...	$l-2\cdot0$	$m-1\cdot0$	$n-1\cdot5$	$o-0\cdot3$	$p-1\cdot0$	12·3	−·2	−·2	...
Nov. 13	4972	...	$l-2\cdot0$	$m-0\cdot7$	$n-0\cdot3$	$o+0\cdot7$	$p+0\cdot7$	11·4	0	−·2	...
Dec. 6	4995	...	$f-1\cdot0$	$g-0\cdot5$	$k+1\cdot0$	$l+0\cdot5$	$m+1\cdot5$	9·2	+·1	0	...
Dec. 27	5016	...	$b-1\cdot5$	$=f$	$g+0\cdot3$	$l+1\cdot5$	$m+2\cdot0$	8·5	+·1	0	...
1900 Jan. 7	5027	...	$b-2\cdot0$	$c-1\cdot5$	$f+1\cdot0$	$g+1\cdot5$	$m+2\cdot0$	8·3	+·1	+·1	...
Jan. 16	5036	...	$b-1\cdot5$	$c-1\cdot5$	$f+1\cdot0$	$g+1\cdot5$	$m+2\cdot5$	8·1	+·1	+·1	...
Jan. 27	5047	...	$a-1\cdot5$	$b-0\cdot7$	$c+0\cdot3$	$f+1\cdot0$	$g+2\cdot0$	7·4	+·1	+·1	...
Feb. 8	5059	...	$b-1\cdot0$	$c-1\cdot0$	$f+1\cdot5$	$g+2\cdot0$	$l+3\cdot0$	7·5	+·1	0	...
Mar. 4	5083	...	$b-1\cdot5$	$c-1\cdot5$	$f+1\cdot5$	$g+2\cdot0$	$l+2\cdot3$	7·8	+·1	0	G.M.T. h. m.
Mar. 12	5011	...	$b-1\cdot5$	$c-1\cdot0$	$f+1\cdot3$	$g+1\cdot7$	$l+2\cdot7$	7·8	+·1	0	7 30
Mar. 17	5096	...	$b-1\cdot3$	$c-1\cdot0$	$f+1\cdot0$	$g+1\cdot5$	$k+2\cdot0$	7·9	+·1	0	9 0
Mar. 26	5 05	...	$c-2\cdot0$	$f-0\cdot5$	$g+0\cdot3$	$k+1\cdot3$	$l+1\cdot7$	8·7	+·1	0	7 15
Apr. 13	5123	...	$f-2\cdot0$	$g-1\cdot0$	$k+0\cdot8$	$l+1\cdot0$	$m+2\cdot0$	9·3	+·1	0	9 20
May 3	5143	...	$k-1\cdot0$	$=l$	$m+1\cdot0$	$o+1\cdot4$	$p+1\cdot4$	10·2	+·1	−·2	9 30
May 24	5164	...	$f-2\cdot6$	$g-2\cdot3$	$l-1\cdot2$	$m-0\cdot5$	$n-0\cdot2$	11·2	−·2	−·1	9 30
June 17	5188	...	$l-2\cdot0$	$m-1\cdot3$	$n-1\cdot0$	$=o$	$p-0\cdot5$	12·1	−·2	−·2	10 50
June 25	5197	...	$k-2\cdot0$	$l-1\cdot5$	$m-1\cdot0$	$o+0\cdot3$	$=p$	11·6	−·1	−·2	11 0
July 7	5208	...	$k-1\cdot5$	$l-1\cdot0$	$m-0\cdot3$	$n+0\cdot4$	$o+1\cdot0$	10·9	0	−·2	10 40

S URSÆ MAJORIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
											h m
1900 July 16	5217	...	$f-2\cdot3$	$g-1\cdot7$	$k-0\cdot8$	$l+0\cdot5$	$m+1\cdot2$	10·1	0	0	10 10
July 23	5224	...	$f-1\cdot5$	$g-0\cdot5$	$k-0\cdot3$	$l+1\cdot0$	$m+1\cdot3$	9·5	−·1	0	10 0
Aug. 5	5237	...	$f-1\cdot0$	$g-1\cdot3$	$k+1\cdot0$	$l+1\cdot4$	$m+2\cdot0$	9·1	+·1	0	9 30
Aug. 12	5244	...	$f-1\cdot0$	$=g$	$k+1\cdot0$	$l+1\cdot2$	$m+2\cdot0$	8·9	+·1	0	9 0
Aug. 18	5250	...	$f-0\cdot3$	$g+0\cdot3$	$k+1\cdot3$	$l+1\cdot7$	$m+2\cdot2$	8·5	+·2	0	10 0
Aug. 30	5262	...	$c-2\cdot0$	$=f$	$g+0\cdot5$	$k+1\cdot5$	$l+2\cdot0$	8·5	+·1	0	8 50
Sept. 8	5271	...	$f+0\cdot2$	$g+1\cdot0$	$k+2\cdot0$	$l+2\cdot0$	$m+3\cdot0$	7·9	+·3	0	8 10
Sept. 15	5278	...	$b-2\cdot0$	$f+1\cdot0$	$g+1\cdot5$	$l+2\cdot0$	$m+2\cdot7$	8·0	+·2	0	9 40
Sept. 25	5288	...	$b-2\cdot0$	$c-1\cdot5$	$f+1\cdot0$	$g+1\cdot2$	$l+2\cdot0$	8·3	+·1	0	9 10
Oct. 8	5301	...	$a-2\cdot5$	$b-2\cdot0$	$c-1\cdot5$	$f+1\cdot0$	$g+2\cdot0$	8·2	−·1	+·1	8 0
Oct. 17	5310	...	$a-2\cdot5$	$b-1\cdot5$	$c-1\cdot0$	$f+1\cdot0$	$g+1\cdot5$	8·1	−·1	+·1	7 50
Oct. 26	5319	...	$b-2\cdot0$	$c-1\cdot3$	$f+1\cdot0$	$g+1\cdot3$	$l+2\cdot3$	8·1	+·1	0	9 40
Nov. 13	5337	...	$=f$	$g+0\cdot6$	$l+1\cdot5$	$m+2\cdot0$	$n+2\cdot0$	8·6	+·2	−·1	7 40
Nov. 29	5353	...	$f-1\cdot3$	$g-0\cdot7$	$k+0\cdot5$	$l+1\cdot0$	$m+1\cdot3$	9·3	+·1	0	7 20
Dec. 5	5359	...	$f-1\cdot5$	$g-1\cdot0$	$k+0\cdot2$	$l+0\cdot4$	$m+1\cdot0$	9·7	+·1	0	8 30
Dec. 28	5382	...	$f-1\cdot8$	$g-1\cdot4$	$l-1\cdot0$	$=m$	$n-0\cdot2$	10·7	−·2	−·1	6 20

S BOÖTIS.

R. A. $14^h\ 19^m\ 32^s$. Dec. $+54°\ 15'{\cdot}9$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1889 Nov. 29	1336	...	3−1·5 10+1·5	6−0·2	7+0·7	8+1·0	9+0·3	9·9	+·1	0	+ ·1
Dec. 24	1361	...	1−1·5	2−2·0	3−0·5	7+1·5	8+1·5	9·1	−·1	0	+ ·3
1890 Jan. 12	1380	...	1−1·0	2−1·5	=3	5+1·5	7+2·0	8·6	0	0	+ ·2
Feb. 8	1407	...	3−1·5	5+1·0	...	...	...	9·4	0	−·1	+ ·3
Feb. 15	1414	...	3−1·0	5+0·5	7+2·0	8+1·5	...	9·1	+·2	−·1	− ·2
Feb. 22	1421	...	3−1·5	5+0·5	7+1·0	8+1·0	20+1·0	9·6	+·2	0	0
Feb. 28	1427	...	5−0·2	6+1·0	7+1·0	20+0·5	21+0·8	9·7	+·2	−·1	− ·4
Mar. 17	1444	...	7−0·5	8−0·8	10+1·0	14+1·0	15+0·7	10·8	0	0	− ·4
Apr. 2	1460	80	7−1·0	8−1·5	=10	20−2·0	21−2·0	12·0	−·2	0	− ·2
Apr. 11	1469	80	7−1·7	8−2·0	10−1·0	=27	...	12·4	−·2	0	− ·2
Apr. 26	1484	80	7−1·0	8−2·0	10−0·5	=27	...	12·1	−·2	0	−1·0
May 12	1500	132	10−2·0	27−1·0	...	...	...	13·3	−·2	0	− ·2
May 26	1514	132	10−1·0	27−1·0	28−0·7	...	...	12·8	−·2	0	− ·8
July 11	1560	...	7−1·3	8−0·7	10+1·0	20−2·0	21−1·0	11·5	−·1	0	− ·5
July 22	1571	...	7−0·2	8+0·5	9−1·0	20−0·5	21+0·3	10·6	0	0	− ·7
Aug. 5	1585	...	6−0·5	=7	8+0·7	20−0·3	21+0·3	10·4	0	0	− ·1
Aug. 13	1593	...	6−0·5	7+0·2	8+0·5	=20	21+0·5	10·3	+·1	0	+ ·1
Aug. 29	1609	...	3−2·0	7+0·7	8+1·0	20+0·5	21+1·0	9·9	+·2	0	+ ·5
Sept. 6	1617	...	1−2·0	3−1·0	5+1·0	7+1·5	8+1·5	9·3	+·1	0	+ ·3
Sept. 27	1638	...	1−1·5	2−1·5	3+0·7	7+2·0	8+2·0	8·6	+·1	0	+ ·2
Oct. 2	1643	...	1−1·0	2−1·3	3+0·3	7+2·0	8+2·0	8·5	+·1	0	+ ·2
Oct. 14	1655	...	1−1·0	2−1·5	3−0·3	7+1·5	8+1·5	8·9	−·1	0	+ ·5
Nov. 1	1673	...	1−2·0	3−0·8	5+1·0	6+1·8	8+2·0	8·9	+·1	0	+ ·2
Nov. 11	1683	...	3−1·3	5+0·5	6+0·8	7+2·3	8+2·0	9·1	+·2	−·1	0
Dec. 13	1715	...	7−0·7	8−0·7	21−0·6	22−0·5	25+0·2	11·2	−·1	0	+ ·5
1891 Jan. 6	1739	80	7−2·0	8−1·5	10−1·0	27+0·5	...	12·2	−·1	0	+ ·3
Feb. 1	1765	132	10−1·5	28−0·3	...	...	...	12·7	−·2	0	− ·6
Mar. 14	1806	80	7−3·0	8−2·3	10−1·5	=27	=28	12·7	−·1	0	− ·3
Mar. 26	1818	80	10−0·7	27+0·3	28+0·6	...	...	11·8	+·1	0	− ·2
Apr. 15	1838	...	7−0·3	8−0·5	10+1·3	20−1·0	21−1·3	11·1	−·1	0	+ ·2
May 11	1864	...	5+0·7	6+1·3	7+1·5	20+1·0	21+1·0	9·2	+·3	−·1	+ ·1
May 25	1878	...	1−2·0	3−1·3	5+1·5	6+1·7	7+2·0	9·0	+·1	−·1	+ 3
June 7	1891	...	1−1·2	3−0·7	5+1·5	20+1·5	21+1·5	8·8	+·1	0	+ ·5
June 21	1905	...	1 ·0·7	2−1·0	3+0·7	5+1·5	6+1·5	8·3	+·1	0	+ ·1
July 3	1917	...	2−1·5	3−0·2	5+1·2	6+2·0	7+2·3	8·5	+·1	0	+ ·2
July 8	1922	...	1−1·0	2−1·3	3+0·5	5+1·5	6+1·5	8·5	+·1	0	+ 2
July 19	1933	...	2−1·5	3−0·7	5+1·0	6+1·6	7+2·0	8·8	+·1	0	+ ·2
July 26	1940	...	3−1·0	5+0·7	6+1·0	7+1·5	8+1·5	9·3	+·2	−·1	+ ·5
Aug. 13	1958	...	3−1·5	5+0·2	6+0·6	7+1·5	8+1·5	9·5	+·2	−·1	− ·1

1890 June 20. Not seen; but twilight.
1891 February 22. Not seen 34, 80, 132. Bright moonlight. February 26. Not seen. Clear dark sky.

S BOÖTIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections. Scale.	Corrections. Stars.	Apparent Correction to Harvard.
1891 Aug. 29	1974	...	=7	8+0·5	10+1·5	20−0·7	21−0·5	10·5	0	0	− ·2
Sept. 9	1985	...	7−1·0	8−0·5	10+0·3	20−1·6	21−1·0	11·5	−·1	0	+ ·1
Sept. 22	1998	80	7−1·3	8−1·0	10+0·5	20−1·3	21−1·0	11·5	−·1	0	− ·7
Oct. 14	2020	132	10−0·5	...	...	...	...	12·0	−·2	0	−1·1
Oct. 29	2035	132	10−2·0	27−1·0	28−0·6	...	...	13·1	−·2	0	− ·3
1892 Jan. 25	2123	...	3−2·0	=7	=8	=20	21+0·5	10·4	0	0	− ·2
Feb. 8	2137	...	3−2·0	=5	7+1·0	8+1·0	=9	9·9	+·1	−·1	0
Mar. 8	2166	...	1−1·6	2−1·0	5+1·3	6+2·0	...	8·6	0	0	− ·2
Mar. 19	2177	...	1−2·0	3−1·0	5+1·5	7+2·0	8+2·6	8·9	+·1	0	+ ·4
Mar. 31	2189	...	2−2·0	3−0·5	5+1·3	7+1·5	8+1·5	9·1	+·1	0	+ ·6
Apr. 16	2205	...	3−1·0	5+1·8	7+1·8	8+1·5	20+2·0	8·8	+·2	0	− ·1
Apr. 27	2216	...	3−1·5	5+0·3	6+0·6	7+1·3	8+1·0	9·7	+·2	−·1	+ ·2
May 17	2236	...	6−0·7	7+0·3	8+0·5	20−0·3	21−0·5	10·5	0	0	(− ·1)
June 3	2253	80	7−1·5	8−1·0	10+0·3	20−1·3	21−1·3	11·7	−·1	0	(− ·1)
July 29	2309	132	10−3·0	27−2·0	28−1·0	...	...	13·9	−·2	0	(+ ·6)
Aug. 17	2328	132	10−1·5	27−0·5	=28	...	...	12·6	−·1	0	(− ·3)
Aug. 25	2336	132	8−2·5	10−1·5	21−3·0	27−0·3	28+0·5	12·7	−·1	0	0
Sept. 8	2350	80	7−2·0	8−1·5	10−0·2	27+1·0	...	11·9	−·1	0	0
Sept. 28	2370	...	5−2·0	7−0·6	8+0·2	20−1·0	=21	11·1	−·1	−·1	+ ·3
Oct. 11	2383	...	=6	7+0·8	8+1·0	20+0·5	21+1·0	9·7	+·2	0	− ·1
Oct. 21	2393	...	{5−0·5 21+1·5	6+0·2	7+1·0	8+1·5	20+1·0}	9·5	+·2	−·1	+ ·3
Nov. 3	2406	...	3−1·2	5+0·3	6+1·2	7+2·0	20+1·2	9·2	+·2	−·1	+ ·6
Nov. 29	2432	...	1−1·2	2 1·0	3+0·4	5+1·5	7+2·5	8·4	+·1	0	+ ·4
Dec. 7	2440	...	1−1·0	2−1·5	3−0·5	5+1·5	6+2·0	8·6	−·1	0	+ ·4
Dec. 27	2460	...	1−1·0	3−0·3	5+1·5	7+2·0	8+2·0	8·7	+·1	0	+ ·3
1893 Jan. 2	2466	...	*a*−1·5	*c*−0·5	*f*+1·5	*h*+1·5	...	8·8	0	+·1	+ ·2
Jan. 13	2477	...	*c*−1·5	*f*+1·0	*g*+2·0	*h*+1·5	...	9·0	+·1	0	0
Jan. 26	2490	...	*c*−1·3	*f*+1·0	*g*+1·0	*h*+1·3	...	9·2	+·1	0	− ·3
Feb. 5	2500	...	*a*−2·0	*c*−1·0	=*f*	*g*+1·3	*h*+1·0	9·3	0	+·1	− ·7
Mar. 1	2524	80	*f*−2·5	*g*−2·0	*h*−1·0	...	...	12·0	−·1	+·1	+1·0
Mar. 10	2533	...	*g*−1·0	*h*−1·0	*r*+1·5	*s*+1·0	...	12·1	0	0	+ ·7
Mar. 18	2541	...	*h*−1·3	*q*+1·0	*r*+1·0	=*s*	...	12·1	0	0	+ ·4
Apr. 6	2560	...	*g*−2·0	*h*−2·0	*r*+0·5	...	...	12·8	0	+·1	+ ·3
Apr. 18	2572	80	*h*−3·0	=*g*	...	...	...	13·6	0	0	+ ·9
May 5	2589	80	*h*−3·0	*n*−1·0	=*p*	=*q*	...	13·5	0	0	+ ·6
May 21	2605	80	*h*−3·0	*m*−1·2	*n*−0·7	*q*−0·5	...	13·5	−·1	−·1	(+ ·6)
June 2	2617	80	*g*−2·5	*h*−2·0	*m*+0·3	*n*+0·5	...	12·3	0	−·1	(0)

1891 November 21. Not seen 34, 80, 132; nor on December 4, 17. On December 23 glimpsed with 80 and 132.
1892 June 23 and July 20. Not seen; but twilight.
In the observations Jan. 2 to Apr. 6 the star *n* was wrongly identified, and the comparisons with it have been rejected.

S Boötis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1893 June 11	2626	...	$f-2\cdot5$	$g-2\cdot0$	$h-1\cdot5$	$m+0\cdot5$	$n+1\cdot0$	11·9	0	−·1	(+ ·2)
June 30	2645	...	$c-2\cdot5$	$f-1\cdot3$	$g-0\cdot3$	$h+1\cdot0$	$m+1\cdot5$	10·5	0	0	(0)
July 17	2662	...	$c-1\cdot5$	$=f$	$g+1\cdot0$	$h+1\cdot5$	...	9·5	0	0	(0)
Aug. 8	2684	...	$a-1\cdot2$	$b-0\cdot5$	$c+0\cdot5$	$g+1\cdot5$	$h+2\cdot0$	8·3	0	+·1	− ·1
Aug. 14	2690	...	$a-2\cdot0$	$b-1\cdot0$	$c-1\cdot0$	$f+1\cdot3$	$g+2\cdot0$	8·7	0	+·1	+ ·4
Aug. 21	2697	...	$a-1\cdot2$	$c+0\cdot5$	$e+1\cdot5$	$f+1\cdot5$	$g+2\cdot0$	8·1	+·1	+·1	− ·1
Aug. 30	2706	...	$a-1\cdot3$	$c+0\cdot3$	$f+1\cdot3$	$g+2\cdot0$	$h+2\cdot5$	8·3	+·1	+·1	0
Sept. 7	2714	...	$a-1\cdot5$	$b-1\cdot0$	$c-0\cdot6$	$f+1\cdot3$	$g+1\cdot6$	8·6	0	+·1	+ ·1
Sept. 12	2719	...	$a-1\cdot5$	$c-0\cdot5$	$f+1\cdot2$	$g+1\cdot5$	$h+2\cdot0$	8·8	0	+·1	+ ·2
Sept. 22	2729	...	$a-2\cdot0$	$c-1\cdot3$	$f+1\cdot0$	$g+1\cdot7$	$h+2\cdot3$	9·0	0	+·1	+ ·1
Oct. 9	2746	...	$a-2\cdot0$	$c-1\cdot2$	$f+0\cdot6$	$g+1\cdot3$	$h+1\cdot3$	9·3	0	+·1	− ·3
Oct. 19	2756	...	$a-1\cdot8$	$c-1\cdot3$	$=f$	$g+1\cdot0$	$h+1\cdot0$	9·5	0	+·1	− ·5
Nov. 5	2773	...	$c-2\cdot3$	$f-1\cdot2$	$g-0\cdot5$	$=h$	$m+2\cdot0$	10·6	0	0	− ·3
Nov. 12	2780	...	$a-3\cdot2$	$f-1\cdot5$	$g-1\cdot3$	$h-0\cdot3$	$m+1\cdot7$	10·9	−·1	+·1	− ·4
Dec. 6	2804	80	$g-2\cdot0$	$h-1\cdot5$	$=m$	...	...	12·1	−·1	0	0
Dec. 30	2828	132	$m-2\cdot0$	...	...	...	...	14·0	−·1	−·2	+1·2
1894 Jan. 23	2852	132	$m-1\cdot0$	$=p$	...	...	...	13·1	0	−·1	+ ·3
Feb. 3	2863	132	$m-1\cdot5$	...	...	...	...	13·5	−·1	−·2	+ ·5
Mar. 2	2890	...	$g-2\cdot0$	$h-2\cdot0$	$m-0\cdot5$	$n+1\cdot0$	$p+1\cdot5$	12·1	0	−·1	+ ·5
Mar. 11	2899	...	$f-1\cdot2$	$g-0\cdot2$	$h-0\cdot5$	$m+1\cdot8$	...	10·6	0	0	− ·3
Mar. 23	2911	...	$c-1\cdot3$	$=f$	$g+0\cdot7$	$h+1\cdot0$	$m+2\cdot0$	9·7	+·1	0	− ·3
Apr. 22	2941	...	$a-1\cdot2$	$c-0\cdot3$	$f+1\cdot2$	$g+1\cdot2$	$h+2\cdot5$	8·6	0	+·1	+ ·1
May 1	2950	...	$a-1\cdot0$	$c+0\cdot2$	$f+1\cdot5$	$g+1\cdot5$	$h+2\cdot0$	8·5	+·1	+·1	+ ·3
May 18	2967	...	$a-1\cdot0$	$=c$	$f+1\cdot0$	$g+1\cdot5$	$h+2\cdot0$	8·6	+·1	+·1	+ ·5
May 29	2978	...	$a-0\cdot7$	$c+0\cdot3$	$f+1\cdot3$	$g+1\cdot6$	$h+2\cdot3$	8·3	+·1	+·1	+ ·1
June 9	2989	...	$a-1\cdot5$	$c-0\cdot4$	$f+1\cdot3$	$g+1\cdot3$	$h+2\cdot0$	8·8	0	+·1	+ ·2
June 20	3000	...	$a-1\cdot5$	$c-0\cdot5$	$f+0\cdot7$	$g+1\cdot0$	$h+1\cdot5$	9·1	0	+·1	+ 2
June 27	3007	...	$a-1\cdot5$	$c-1\cdot0$	$f+0\cdot5$	$g+1\cdot3$	$h+1\cdot6$	9·1	0	+·1	− 1
July 4	3014	...	$a-1\cdot5$	$c-1\cdot3$	$f-0\cdot4$	$g+0\cdot6$	$h+1\cdot3$	9·6	0	+·1	0
July 21	3031	...	$c-1\cdot5$	$f-1\cdot0$	$g-0\cdot3$	$h+0\cdot7$	...	10·2	0	0	− 4
Aug. 26	3067	...	$f-2\cdot5$	$g-2\cdot0$	$h-1\cdot3$	$m+0\cdot5$	$n+1\cdot2$	11·8	0	−·1	− ·4
Sept. 1	3073	...	$f-2\cdot5$	$g-1\cdot7$	$h-1\cdot0$	$m-0\cdot3$	$n+0\cdot5$	12·0	−·1	−·1	− ·4
Sept. 29	3101	80	$f-3\cdot0$	$g-2\cdot0$	$h-2\cdot0$	$m-1\cdot0$	$=n$	12·6	−·1	−·1	(− ·1)
Oct. 21	3123	132	$h-3\cdot0$	$m-1\cdot3$	$n-0\cdot5$	...	...	13·3	−·1	−·1	(+ ·8)
Nov. 5	3138	132	$m-1\cdot0$	$p+0\cdot5$	$q+0\cdot5$	...	...	13·0	0	−·1	(+ ·8)
Nov. 19	3152	...	$m+0\cdot3$	$n+1\cdot0$	$p+1\cdot5$	$q+1\cdot5$	...	11·8	+·1	−·1	(0)
Nov. 25	3158	80	$g-1\cdot3$	$h-1\cdot3$	$m+0\cdot3$	$n+2\cdot0$	$p+2\cdot0$	11·5	0	−·1	− 2
Dec. 15	3178	...	$c-3\cdot0$	$f-1\cdot0$	$=g$	$=h$	$m+2\cdot0$	10·6	0	0	− ·3
1895 Jan. 18	3212	...	$a-2\cdot0$	$c-1\cdot0$	$f+1\cdot0$	$g+1\cdot0$	$h+1\cdot5$	9·2	0	+·1	(+ ·2)
Jan. 26	3220	...	$a-1\cdot3$	$c-0\cdot8$	$f+1\cdot0$	$g+1\cdot5$	$h+2\cdot0$	8·8	0	+·1	(+ ·1)
Feb. 5	3230	...	$a-1\cdot3$	$c-1\cdot0$	$f+1\cdot2$	$g+1\cdot5$	$h+2\cdot0$	8·8	0	+·1	(+ 4)
Feb. 17	3242	...	$a-1\cdot3$	$c-0\cdot7$	$f+0\cdot7$	$g+1\cdot5$	$h+2\cdot0$	8·9	0	+·1	(+ 9)
Mar. 4	3257	...	$a-1\cdot5$	$c-1\cdot0$	$f+1\cdot0$	$g+1\cdot3$	$h+2\cdot0$	8·9	0	+·1	(+1·3)
Mar. 17	3270	...	$a-2\cdot0$	$c-1\cdot0$	$f+1\cdot0$	$g+1\cdot0$	$h+2\cdot0$	9·1	0	+·1	(+1·6)
Mar. 28	3281	...	$a-2\cdot0$	$c-1\cdot3$	$=f$	$g+1\cdot0$	$h+1\cdot0$	9·6	0	+·1	(+1·9)

1894 February 21. Just glimpsed 132.

S BOÖTIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1895 Apr. 12	3296	...	$a-2\cdot0$	$c-1\cdot3$	$f-1\cdot0$	$=g$	$=h$	10·2	−·1	+·1	+·5
May 4	3318	...	$c-3\cdot0$	$f-2\cdot0$	$g-2\cdot0$	$h-1\cdot0$	$m+1\cdot0$	11·6	−·1	0	+·2
May 22	3336	80	$f-2\cdot5$	$g-2\cdot0$	$h-2\cdot0$	$m-0\cdot5$	...	12·4	−·1	0	+·3
June 2	3347	80	$h-2\cdot0$	$m-0\cdot3$	$n-0\cdot3$	...	...	12·7	−·1	−·1	(+·1)
June 27	3372	132	$m-0\cdot8$	$n-0\cdot8$	...	...	...	13·1	−·1	−·2	(+·3)
July 28	3403	80	$g-2\cdot0$	$h-1\cdot5$	$m-1\cdot0$	$=n$	...	12·4	−·1	−·1	(+·1)
Aug. 13	3419	...	$c-2\cdot5$	$f-1\cdot3$	$g-0\cdot3$	$h-0\cdot3$	$m+0\cdot7$	10·9	−·1	0	−·6
Aug. 28	3434	...	$c-1\cdot3$	$f-0\cdot7$	$=g$	$=h$	$m+2\cdot0$	10·2	0	0	−·5
Sept. 8	3445	...	$a-2\cdot0$	$c-1\cdot3$	$f-0\cdot5$	$=g$	$h+0\cdot7$	9·9	−·1	+·1	−·3
Sept. 25	3462	...	$a-1\cdot5$	$c-1\cdot0$	$f+0\cdot3$	$g+1\cdot0$	$h+1\cdot2$	9·3	0	+·1	−·3
Oct. 14	3481	...	$a-1\cdot5$	$c-1\cdot0$	$f+0\cdot5$	$g+1\cdot0$	$h+1\cdot5$	9·2	0	+·1	+·2
Oct. 23	3490	...	$a-1\cdot7$	$c-1\cdot2$	$f+1\cdot0$	$g+1\cdot5$	$h+2\cdot0$	9·0	0	+·1	+·3
Nov. 9	3507	...	$a-1\cdot3$	$c-0\cdot3$	$f+1\cdot3$	$g+1\cdot6$	$h+2\cdot0$	8·6	0	+·1	+·3
Nov. 17	3515	...	$a-1\cdot3$	$c-0\cdot6$	$f+1\cdot3$	$g+1\cdot7$	$h+2\cdot0$	8·7	0	+·1	+·4
Nov. 30	3528	...	$a-1\cdot3$	$c-0\cdot3$	$f+1\cdot3$	$g+1\cdot6$	$h+2\cdot0$	8·6	0	+·1	+·2
Dec. 13	3541	...	$a-1\cdot5$	$c-0\cdot7$	$f+1\cdot0$	$g+1\cdot3$	$h+1\cdot3$	9·0	0	+·1	+·3
1896 Jan. 4	3563	...	$f-1\cdot0$	$=g$	$h+0\cdot7$	...	...	10·3	0	+·1	+·5
Jan. 22	3581	...	$a-3\cdot0$	$f-2\cdot0$	$g-1\cdot0$	$h-0\cdot3$	...	11·1	−·1	+·1	+·2
Feb. 4	3594	...	$c-3\cdot0$	$f-1\cdot7$	$g-1\cdot0$	$h-1\cdot0$	$=m$	11·5	−·1	0	−·1
Feb. 20	3610	132	$h-2\cdot0$	$m-0\cdot5$	...	...	...	12·6	−·1	−·1	+·3
Mar. 14	3633	80	$f-2\cdot5$	$g-2\cdot0$	$h-2\cdot0$	$m-1\cdot0$	$=n$	12·5	−·1	−·1	−·3
Apr. 8	3658	...	$f-2\cdot3$	$g-1\cdot5$	$h-1\cdot0$	$m-0\cdot5$	$n+0\cdot2$	12·0	−·1	−·1	−·9
Apr. 19	3669	80	$f-3\cdot0$	$g-2\cdot5$	$h-2\cdot0$	$m-1\cdot0$	$=n$	12·7	−·1	−·1	+·1
Apr. 29	3679	...	$g-1\cdot4$	$h-1\cdot2$	$m-0\cdot3$	$n+0\cdot4$	...	12·0	0	−·1	−·1
May 14	3694	...	$c-2\cdot0$	$g-1\cdot0$	$h-0\cdot5$	$m+1\cdot0$	$n+1\cdot0$	10·9	0	−·1	−·6
May 28	3708	...	$c-2\cdot0$	$f-1\cdot0$	$=g$	$h+0\cdot2$	$m+1\cdot3$	10·5	0	0	−·1
June 19	3730	...	$a-1\cdot5$	$c-1\cdot0$	$f+0\cdot3$	$g+1\cdot0$	$h+1\cdot0$	9·3	0	+·1	−·2
June 29	3740	...	$a-1\cdot5$	$c-1\cdot3$	$f+0\cdot5$	$g+1\cdot0$	$h+1\cdot0$	9·4	0	+·1	+·3
July 18	3759	...	$a-1\cdot5$	$c-0\cdot3$	$f+1\cdot2$	$g+1\cdot7$	$h+1\cdot5$	8·8	0	+·1	+·3
Aug. 3	3775	...	$a-1\cdot5$	$c-0\cdot2$	$f+1\cdot0$	$g+2\cdot0$	$h+2\cdot0$	8·6	0	+·1	+·3
Aug. 13	3785	...	$a-1\cdot4$	$c-0\cdot7$	$f+1\cdot0$	$g+1\cdot6$	$h+1\cdot6$	8·9	0	+·1	+·4
Sept. 2	3805	...	$a-2\cdot0$	$c-1\cdot3$	$=f$	$g+1\cdot0$	$h+1\cdot3$	9·5	0	+·1	+·4
Sept. 16	3819	...	$a-2\cdot0$	$c-1\cdot5$	$f-0\cdot7$	$g+0\cdot5$	$h+1\cdot0$	9·8	0	+·1	0
Sept. 28	3831	...	$f-1\cdot3$	$g-0\cdot2$	$h+0\cdot3$	$m+2\cdot0$	...	10·4	0	0	−·1
Oct. 9	3842	...	$c-2\cdot0$	$f-1\cdot3$	$g-0\cdot3$	$=h$	$m+1\cdot0$	10·7	0	0	−·4
Oct. 27	3860	...	$c-3\cdot5$	$f-2\cdot5$	$g-1\cdot5$	$h-1\cdot0$	$=m$	11·9	−·1	0	−·2
Nov. 4	3868	80	$g-2\cdot0$	$h-1\cdot5$	$m-1\cdot0$	$=n$	...	12·5	−·1	−·1	+·2
Dec. 7	3901	80	$g-3\cdot0$	$h-3\cdot0$	$m-1\cdot5$	$n-0\cdot5$	...	13·4	−·1	−·1	+·5
1897 Jan. 23	3948	...	$c-3\cdot0$	$f-2\cdot0$	$g-2\cdot0$	$h-2\cdot0$	$m-0\cdot3$	12·1	−·1	0	+·6
Feb. 14	3970	...	$a-3\cdot0$	$c-2\cdot3$	$f-0\cdot8$	$g-0\cdot2$	$h+0\cdot4$	10·5	−·1	+·1	+·3
Mar. 13	3997	...	$a-2\cdot0$	$c-1\cdot5$	$=g$	$h+1\cdot0$	...	9·7	0	+·1	+·6
Mar. 22	4006	...	$a-1\cdot6$	$c-1\cdot3$	$g+1\cdot2$	$h+1\cdot2$	...	9·2	0	+·1	+·4
Apr. 7	4022	...	$a-1\cdot2$	$c-1\cdot5$	$f+1\cdot0$	$g+1\cdot0$	$h+1\cdot3$	9·2	0	+·1	+·8
Apr. 24	4039	...	$a-1\cdot3$	$c-0\cdot3$	$f+1\cdot3$	$g+1\cdot3$	$h+1\cdot6$	8·8	0	+·1	+·6
May 5	4050	...	$a-1\cdot0$	$=c$	$f+1\cdot2$	$g+1\cdot6$	$h+1\cdot6$	8·6	+·1	+·1	+·6
May 20	4065	...	$a-1\cdot2$	$c-0\cdot2$	$f+1\cdot2$	$g+1\cdot6$	$h+1\cdot6$	8·7	0	+·1	+·4

S Boötis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1897 June 2	4078	...	$a-1.5$	$c-0.6$	$f+0.6$	$g+1.0$	$h+1.5$	9.1	0	+.1	+.6
June 16	4092	...	$a-2.5$	$c-1.3$	$f+0.5$	$g+0.5$	$h+1.0$	9.7	0	+.1	+.4
July 13	4119	...	$a-3.5$	$c-2.3$	$f-1.3$	$g-1.0$	$h-0.2$	11.0	−.1	+.1	...
July 26	4132	...	$f-2.0$	$g-1.5$	$h-1.3$	$=m$	...	11.8	−.1	0	...
Aug. 3	4140	...	$f-1.6$	$g-1.6$	$h-1.2$	$=m$	$=n$	11.9	−.1	−.1	...
Aug. 11	4148	80	$f-3.3$	$g-2.0$	$h-1.6$	$m-1.0$	...	12.6	−.1	0	...
Aug. 19	4156	132	$f-4.0$	$g-3.0$	$h-2.0$	$m-1.3$	...	13.2	−.1	0	...
Aug. 25	4162	132	$f-4.0$	$g-3.0$	$h-2.0$	$m-1.0$	...	13.1	−.1	0	...
Sept. 12	4180	132	$f-4.0$	$g-3.0$	$h-2.5$	$m-1.0$	$n-0.5$	13.2	−.1	−.1	...
Sept. 26	4194	132	$g-3.0$	$h-2.0$	$m-1.0$	$n-0.5$	...	12.9	−.1	−.1	...
Oct. 26	4224	80	$c-4.0$	$f-2.5$	$g-1.0$	$h-0.6$	$m+0.5$	11.7	−.1	0	+1.4
Nov. 6	4235	...	$c-2.5$	$f-1.3$	$g-0.5$	$h+0.5$	$m+2.0$	10.6	0	0	+.6
Nov. 29	4258	...	$a-2.5$	$c-1.5$	$f+0.2$	$g+1.0$	$h+1.0$	9.7	0	+.1	+.2
Dec. 20	4279	...	$a-2.5$	$c-1.2$	$f+0.8$	$g+1.3$	$h+1.3$	9.4	0	+.1	+.1
1898 Jan. 3	4293	...	$a-2.0$	$c-1.0$	$f+1.0$	$g+1.5$	$h+2.0$	9.0	+.1	+.1	−.1
Feb. 2	4323	...	$a-2.0$	$c-1.0$	$f+1.5$	$g+2.0$	$h+2.0$	8.8	+.1	+.1	−.2
Feb. 19	4340	...	$a-2.0$	$c-1.0$	$f+1.0$	$g+1.0$	$h+1.2$	9.3	+.1	+.1	+.1
Mar. 2	4351	...	$a-2.0$	$c-1.3$	$=f$	$g+1.0$	$h+1.0$	9.6	0	+.1	−.2
Mar. 11	4360	...	$c-1.5$	$f-0.5$	$=g$	$=h$	$m+2.0$	10.2	0	0	−.2
Mar. 21	4370	...	$c-2.0$	$f-0.5$	$g-0.5$	$=h$	$m+1.2$	10.6	−.1	0	−.3
Apr. 5	4385	...	$c-2.3$	$f-1.3$	$g-1.3$	$h-1.0$	$m+1.0$	11.2	−.1	0	−.2
Apr. 29	4409	80	$f-2.3$	$g-2.0$	$h-1.5$	$m-1.0$	$=n$	12.4	−.2	−.1	...
May 12	4422	...	$f-2.3$	$g-2.0$	$h-1.0$	$m-0.5$	$n-0.5$	12.3	−.2	−.1	...
June 16	4457	80	$f-3.0$	$g-2.0$	$h-0.8$	$m+1.0$	$n+1.0$	11.8	0	−.1	...
July 7	4478	80	$c-3.0$	$f-2.5$	$g-1.2$	$h-1.0$	$m+0.4$	11.7	−.1	0	...
July 27	4498	...	$c-2.5$	$f-1.3$	$g-0.8$	$=h$	$m+1.5$	10.8	−.1	0	...
Aug. 4	4506	...	$a-3.0$	$c-2.0$	$f-1.0$	$g+1.0$	$h+1.2$	10.1	0	+.1	(0)
Aug. 20	4522	...	$a-2.0$	$c-1.3$	$f+0.2$	$g+1.0$	$h+1.2$	9.5	+.1	+.1	(+.1)
Sept. 1	4534	...	$a-2.0$	$c-1.3$	$=f$	$g+1.3$	$h+1.6$	9.4	0	+.1	(+.3)
Sept. 14	4547	...	$a-1.5$	$c-1.0$	$f+1.0$	$g+1.5$	$h+1.8$	8.9	+.1	+.1	(+.1)
Sept. 23	4556	...	$a-1.3$	$c-0.5$	$f+1.0$	$g+1.7$	$h+2.0$	8.7	+.1	+.1	(+.2)
Oct. 9	4572	...	$a-2.0$	$c-0.8$	$f+1.3$	$g+2.0$	$h+2.0$	8.8	+.1	+.1	(+.4)
Oct. 23	4586	...	$a-2.0$	$c-1.0$	$f+1.5$	$g+1.8$	$h+2.0$	8.8	+.1	+.1	+.3
Nov. 5	4599	...	$a-2.0$	$c-1.2$	$f+0.4$	$g+1.5$	$h+1.8$	9.2	+.1	+.1	+.3
Nov. 18	4612	...	$c-2.0$	$=f$	$g+1.0$	$h+1.3$	$m+2.0$	9.7	+.1	0	...
Dec. 13	4637	...	$c-2.5$	$f-1.3$	$=g$	$=h$	$m+1.2$	10.7	0	0	...
Dec. 30	4654	...	$c-3.5$	$f-2.0$	$g-1.0$	$h-0.5$	$m+0.5$	11.5	−.1	0	...
1899 Feb. 13	4699	80	$c-3.5$	$f-2.5$	$g-2.0$	$h-2.0$	$m-1.0$	12.4	−.2	0	...
Feb. 27	4713	132	$g-3.0$	$h-2.3$	$m-1.0$	$n-0.5$	...	13.1	−.2	−.1	...
Mar. 9	4723	...	$f-3.0$	$g-2.0$	$h-2.0$	$m-1.0$	$=n$	12.6	−.2	−.1	...
Mar. 15	4729	80	$f-3.0$	$g-2.0$	$h-2.0$	$m-1.0$	$=n$	12.6	−.2	−.1	...
Apr. 7	4752	...	$c-2.7$	$f-1.5$	$g-1.0$	$h-1.0$	$m+0.3$	11.4	−.1	0	...
Apr. 19	4764	...	$a-2.5$	$c-2.0$	$f-1.0$	$g-0.5$	$=h$	10.5	−.2	+.1	...
May 3	4778	...	$a-2.5$	$c-1.5$	$=f$	$g+1.0$	$h+1.3$	9.6	0	+.1	0
May 28	4803	...	$a-1.3$	$c-0.3$	$f+1.0$	$g+1.3$	$h+2.0$	8.8	+.1	+.1	−.1
June 6	4812	...	$a-2.0$	$c-1.3$	$f+1.5$	$g+1.5$	$h+2.5$	8.9	+.1	+.1	+.2

S BOÖTIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1899 June 10	4816	...	$a-2\cdot3$	$c-1\cdot0$	$f+1\cdot7$	$g+1\cdot5$	$h+2\cdot0$	8·9	+·1	+·1	+·3
June 16	4822	...	$a-1\cdot5$	$b-1\cdot3$	$c-1\cdot0$	$f+1\cdot4$	$g+1\cdot6$	8·9	−·1	+·1	+·2
July 3	4839	...	$a-1\cdot5$	$c-0\cdot5$	$f+2\cdot0$	$g+2\cdot3$	$h+2\cdot5$	8·3	+·1	+·1	−·1
July 20	4856	...	$a-2\cdot3$	$c-1\cdot0$	$f+1\cdot5$	$g+1\cdot7$	$h+2\cdot0$	8·9	+·1	+·1	+·3
July 29	4865	...	$a-2\cdot3$	$c-1\cdot5$	$f+1\cdot0$	$g+2\cdot0$	$h+2\cdot0$	9·0	+·1	+·1	+·2
Aug. 6	4873	...	$c-1\cdot7$	$f-0\cdot7$	$g+0\cdot3$	$h+1\cdot5$	$m+3\cdot0$	9·7	+·1	0	+·5
Aug. 18	4885	...	$c-2\cdot0$	$f-0\cdot4$	$g+0\cdot7$	$h+1\cdot3$	$m+2\cdot5$	9·8	+·1	0	0
Sept. 2	4900	...	$f-2\cdot0$	$g-0\cdot5$	$h+0\cdot7$	$m+1\cdot3$	$n+2\cdot0$	10·7	0	−·1	0
Sept. 27	4925	...	$c-3\cdot0$	$f-1\cdot7$	$g-1\cdot0$	$h-0\cdot3$	$m+1\cdot0$	11·2	−·1	0	−·6
Oct. 7	4934	...	$f-2\cdot5$	$g-1\cdot0$	$h-0\cdot5$	$m+0\cdot2$	$n+0\cdot6$	11·6	0	−·1	−·6
Oct. 14	4942	80	$f-2\cdot0$	$g-1\cdot3$	$h-1\cdot0$	$=m$	$n+0\cdot5$	11·8	−·1	−·1	−·7
Nov. 6	4965	80	$f-3\cdot0$	$g-2\cdot5$	$h-2\cdot0$	$m-1\cdot0$	$=n$	12·7	−·2	−·1	−·4
Dec. 6	4995	80	$c-4\cdot0$	$f-3\cdot0$	$g-2\cdot0$	$h-2\cdot2$	$m-1\cdot0$	12·6	−·2	0	−·2
Dec. 30	5019	...	$c-3\cdot0$	$f-2\cdot0$	$g-1\cdot0$	$h-1\cdot0$	$m+0\cdot6$	11·5	−·1	0	...
1900 Jan. 7	5027	...	$c-2\cdot3$	$f-1\cdot5$	$g-0\cdot5$	$h+0\cdot7$	$m+1\cdot3$	10·6	0	0	...
Jan. 18	5038	...	$a-2\cdot0$	$c-1\cdot0$	$=f$	$g+0\,2$	$h+0\cdot5$	9·7	0	+·1	...
Jan. 27	5047	...	$a-2\cdot0$	$c-1\cdot0$	$f+1\cdot0$	$g+1\cdot0$	$h+1\cdot3$	9·2	+·1	+·1	...
Feb. 8	5059	...	$a-1\cdot8$	$c-1\cdot3$	$f-1\cdot0$	$g+1\cdot0$	$h+2\cdot0$	9·5	−·1	+·1	...
Mar. 1	5080	...	$a-1\cdot5$	$c-0\cdot7$	$f+2\cdot0$	$g+2\cdot0$	$h+2\cdot5$	8·4	+·1	+·1	G M.T. h m
Mar. 13	5092	...	$a-1\cdot3$	$c+0\cdot5$	$f+1\cdot6$	$g+2\cdot0$	$h+2\cdot0$	8·3	+·2	+·1	8 0
Mar. 26	5105	...	$a-1\cdot0$	$c+1\cdot0$	$f+2\cdot0$	$g+2\cdot0$	$h+3\cdot0$	7·9	+·2	+·1	8 10
Apr. 13	5123	...	$a-1\cdot5$	$c+0\cdot3$	$f+2\cdot0$	$g+2\cdot0$	$h+2\cdot7$	8·2	+·2	+·1	9 30
Apr. 18	5128	...	$a-1\cdot5$	$c-0\cdot7$	$f+1\cdot5$	$g+1\cdot7$	$h+1\cdot7$	8·7	+·1	+·1	9 40
Apr. 28	5138	...	$a-2\cdot0$	$c-1\,0$	$f+1\cdot5$	$g+1\cdot7$	$h+2\,0$	8·8	+·1	+·1	9 20
May 3	5143	...	$a-2\cdot3$	$c-1\cdot0$	$f+1\cdot3$	$g+1\cdot7$	$h+2\cdot3$	8·9	+·1	+·1	9 40
May 24	5164	...	$a-3\cdot0$	$c-2\cdot0$	$=f$	$g+0\cdot7$	$h+1\cdot0$	9·9	0	+·1	9 40
June 2	5173	...	$a-3\cdot0$	$c-2\cdot0$	$f-1\cdot0$	$g-1\cdot0$	$h+0\cdot7$	10·5	−·1	+·1	9 20
July 3	5204	80	$f-2\cdot5$	$g-1\cdot5$	$h-2\cdot0$	$m+0\cdot2$	...	12·1	−·1	0	10 40
July 17	5218	132	$f-2\,5$	$g-2\,0$	$h-1\cdot3$	$m-0\cdot3$	$n+0\cdot2$	12·2	−·1	−·1	10 20
Aug. 5	5237	132	$g-3\cdot0$	$h-3\cdot0$	$m-2\cdot0$	$n-1\,0$	...	13·5	−·2	−·1	10 0
Aug. 15	5247	80	$f-3\cdot5$	$g-2\cdot3$	$h-1\cdot7$	$m-1\cdot2$	$n-1\cdot0$	12·9	−·2	−·1	10 0
Aug. 31	5263	132	$g-2\cdot5$	$h-2\cdot0$	$m-1\cdot0$	...	...	12·7	−·2	0	9 40
Sept. 13	5276	...	$f-2\cdot7$	$g-2\cdot0$	$h-1\cdot0$	$m-0\cdot3$	$=n$	12·2	−·2	−·1	8 50
Sept. 19	5282	...	$f-2\cdot0$	$g-1\cdot0$	$h-0\cdot8$	$m+0\,2$	$n+1\cdot0$	11·5	0	−·1	7 50
Sept. 30	5293	...	$c-3\cdot0$	$f-1\cdot5$	$g-1\cdot0$	$h-0\cdot7$	$m+1\cdot0$	11·2	−·1	0	10 0
Oct. 10	5303	...	$c-2\cdot5$	$f-0\cdot8$	$g-0\cdot3$	$h+0\cdot7$	$m+2\cdot2$	10·3	0	0	7 40
Oct. 19	5312	...	$c-2\cdot5$	$f-1\cdot0$	$g+1\,0$	$h+1\cdot0$	$m+1\cdot8$	10·1	0	0	7 40
Nov. 13	5337	...	$a-2\cdot5$	$c-1\cdot3$	$f+0\cdot5$	$g+1\cdot0$	$h+1\cdot7$	9·3	+·1	0	7 20
Dec. 13	5367	...	$a-1\cdot0$	$c+0\cdot3$	$f+2\cdot0$	$g+3\cdot0$	$h+3\cdot0$	7·8	+·2	+·1	6 0
Dec. 19	5373	...	$a-2\cdot0$	$c+0\cdot3$	$f+1\cdot5$	$g+2\cdot0$	$h+2\cdot0$	8·5	+·2	+·1	7 50
Dec. 28	5382	...	$a-1\cdot5$	$c-0\cdot3$	$f+1\cdot5$	$g+2\cdot0$	$h+2\,0$	8·5	+·1	+·1	6 30

R CAMELOPARDI.

R.A. $14^h\ 25^m\ 6^s$. Dec. $+84°\ 17'{\cdot}2$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1889 Feb. 8	1042	...	8−0·6 13−0·6	9−0·8	10−1·0	11−0·6	12−0·6	11·1	−·2	+·6	...
Mar. 22	1084	80	10−2·3	11−2·0	12−2·3	...	...	12·5	−·2	+·7	− ·5
Apr. 22	1115	80	8−1·5	9−2·0	11−2·0	17−0·7	18−0·7	12·3	−·2	+·7	+ ·8
May 20	1143	...	1−3·0	2−0·3	3−1·3	8+2·0	9+1·5	9·5	−·1	+·7	− ·2
June 12	1166	...	1−1·3	2+1·5	3+0·5	7+1·0	...	8·4	+·2	+·7	0
July 2	1186	...	1−1·0	2+1·5	3+0·5	7+2·5	...	7·9	+·2	+·7	0
July 13	1197	...	1−0·3	3+1·5	7+2·3	...	...	7·3	+·1	+·8	− ·3
July 17	1201	...	1−0·2	2+2·2	3+1·7	7+3·0	...	7·1	+·2	+·7	− ·6
July 26	1210	...	1+0·7	2+2·0	3+1·5	7+2·0	...	7·2	+·3	+·7	− ·4
July 31	1215	...	1+0·5	2+2·5	3+2·0	7+2·5	...	6·9	+·3	+·7	− ·7
Aug. 6	1221	...	1+1·0	2+2·0	3+2·6	4+4·0	7+3·0	6·5	+·3	+·7	−1·2
Aug. 13	1228	...	1+0·7	2+3·0	3+2·0	7+3·0	...	6·6	+·3	+·7	−1·3
Aug. 29	1244	...	1+0·3	2+2·0	3+1·0	8+3·0	11+3·0	7·4	+·3	+·7	− ·8
Oct. 5	1281	...	1−2·0	2−0·4	3−1·0	8+1·5	11+1·5	9·4	−·1	+·7	− ·4
Oct. 20	1296	...	=8	9−0·7	11+0·5	18+2·0	20+2·0	10·0	+·1	+·6	− ·2
Nov. 25	1332	132	8−2·5	9−2·5	11−2·0	19+0·3	...	12·7	−·1	+·6	+ ·1
1890 Feb. 7	1406	...	8−0·5	9−0·5	10−1·5	11−0·5	15+0·5	11·1	−·1	+·6	+ ·5
Feb. 25	1424	...	2−0·7	3−1·0	8+2·0	9+1·5	11+1·5	9·2	+·1	+·6	− ·2
Mar. 17	1444	...	1−1·3	2+0·7	3−0·2	9+2·0	11+2·0	8·6	+·1	+·7	+ ·1
Mar. 28	1455	...	1−1·5	2+1·0	3+0·3	7+1·5	11+2·5	8·3	+·2	+·7	+ ·2
Apr. 11	1469	...	1−1·0	2+1·0	3+0·5	9+2·5	11+2·5	8·1	+·2	+·7	+ ·3
Apr. 22	1480	...	1−0·5	2+1·5	3+0·5	8+3·0	9+2·5	7·9	+·2	+·7	+ ·3
Apr. 28	1486	...	=1	2+2·0	3+1·5	...	...	7·2	+·2	+·8	− ·2
May 5	1493	...	1+0·5	2+2·0	3+1·5	7+2·5	...	7·2	+·3	+·7	− ·2
May 12	1500	...	1+1·0 9+3·0	2+2·5	3+2·0	4+3·0	8+4·0	6·8	+·3	+·7	− ·6
May 26	1514	...	1+0·7	2+3·0	3+2·0	...	...	7·0	+·3	+·7	− ·6
June 14	1533	...	1−0·7	2+1·3	3+0·7	8+2·5	11+2·5	8·0	+·2	+·7	− ·3
June 26	1545	...	1−2·0	2+0·5	3−0·2	7+1·0	...	9·0	0	+·7	0
July 6	1555	...	2−0·5	3−1·0	8+2·0	9+1·5	11+1·5	9·2	+·1	+·6	− ·3
July 22	1571	...	2−1·2	8+0·5	9−0·2	10+0·5	11+0·5	10·2	0	+·6	− ·3
Aug. 5	1585	...	8−0·8	9−1·3	11−0·8	17+0·6	18+0·3	11·3	0	+·6	+ ·2
Oct. 9	1650	...	19−0·7	...	...	...	...	13·0	−·1	+·6	+ ·5
Nov. 1	1673	80	8−2·3	11−2·3	12−1·3	15−1·3	19+0·5	12·3	−·1	+·6	+ ·4
Nov. 9	1681	80	8−2·0	17+0·5	18−0·5	19+1·0	20−1·0	11·8	0	+·6	+ ·2
Nov. 26	1698	80	2−1·5	3−2·0	8−0·5	9−0·8	11−0·5	11·0	−·2	+·6	+ ·3
Dec. 14	1716	...	2−0·8	3−1·5	8+1·0	9+1·4	11+1·4	9·6	+·1	+·6	+ ·5
Dec. 24	1726	...	1−1·7	2+0·3	3−0·5	9+2·0	...	9·0	0	+·7	+ ·2
1891 Jan. 6	1739	...	1−0·5	2+1·5	3+1·0	7+2·0	...	7·8	+·2	+·7	− ·3

1889 Dec. 20. Not seen with 34, 80, or 132; nor on Jan. 10.
1890 Aug. 29. Not seen with 34, 80, or 132. Moon nearly full.
1890 Sept. 5. Not seen 34 and 80. Just visible 132. Similar observations on Sept. 14, Oct. 3, and Oct. 9.

R Camelopardi—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1891 Jan. 10	1743	...	1−0·6	2+0·6	3+1·2	8+2·0	9+2·0	8·3	+·2	+·7	+ ·4
Jan. 24	1757	...	1+1·0	2+2·5	3+2·0	7+3·0	11+3·7	6·7	+·3	+·7	− ·9
Feb. 5	1769	...	1+0·7	2+1·5	3+1·5	9+3 0	11+3·0	7·3	+·3	+·7	− ·1
Feb. 12	1776	...	2+1·5	3+1·5	7+2·0	9+3·0	11+3·0	7·5	+·3	+ 6	0
Feb. 18	1782	...	1+0·7	2+2·0	3+1·3	9+3·0	11+3·0	7·2	+·3	+·6	− ·3
Mar. 3	1795	...	1−0·8	2+1·5	3+0 8	9+2·5	11+2·5	7·9	+ 2	+·7	+ ·3
Mar. 14	1806	...	1−1·2	2+1·3	3+0·5	9+2·0	11+2·0	8·3	+·2	+·7	+ ·5
Mar. 28	1820	...	1−1·2	2+1·4	3+0 8	9+2·0	11+2·0	8·2	+·2	+·7	0
Apr. 17	1840	...	2−1·0	3−1·8	8+2·0	9+1·5	11+1 5	9·5	+·1	+·6	+ ·4
May 25	1878	...	7−1·0	8−0·8	9−1·2	19+1·5	...	11·2	−·1	+·6	+ ·4
July 1	1915	80	8−2·0	9−2·6	11−2·0	=19	...	12·7	−·1	+·6	− ·2
July 25	1939	80	8−2·0	9−3·0	11−2·0	19−0·2	...	12·8	−·2	+·6	0
Aug. 15	1960	...	8−0·7	9−1·0	11−0·5	17+0·2	18+0·2	11·3	0	+·6	+ ·1
Sept. 2	1978	...	2−0·2	3−1·3	8+1·6	9+1·0	11+1·8	9·3	+·1	+·6	− ·5
Sept. 12	1988	...	1−1·6	2−0·3	3−1·2	8+1·3	11+1·3	9·4	−·1	+·7	+ ·3
Oct. 4	2010	...	1−0·5	2+1·0	3+0·4	8+2·0	11+2 0	8·3	+·2	+ 7	+ ·9
Oct. 24	2030	...	1+0·5	2+1·8	3+1·2	7+2 0	...	7·4	+·3	+ 7	+ ·5
Oct. 29	2035	...	1+0·7	2+1·8	3+1·3	11+2·5	...	7·4	+·3	+·8	+ ·6
Nov. 20	2057	...	1−0 7	2+1·0	=3	...	...	8 3	0	+ 8	+ ·7
Dec. 4	2071	...	1−1·0	2+1·3	3+0 5	8+2·3	11+2 3	8·2	+·2	+·7	+ ·5
Dec. 21	2088	...	1−1·3	2+0·5	3−0·3	8+2·5	11+2·5	8·5	+·1	+·7	+ ·2
1892 Jan. 27	2125	...	2−1·3	3−2·0	8+0·5	9+0·7	11+0 5	10·1	0	+·6	+ ·6
Feb. 21	2150	...	8+0·5	=9	10−1·0	11−0 6	...	10·7	−·1	+·7	+ 2
Mar. 8	2166	132	8−1·3	9−1·6	11−1 0	...	...	11·8	−·2	+·7	+ ·5
Mar. 18	2176	...	8−1·3	9−1·5	11−2·0	=19	...	12·2	− 2	+·6	+ ·2
Mar. 29	2187	80	2−3 0	8−1·2	9−1·6	11−2·3	19−0·5	12·3	−·2	+·6	+ ·1
Apr. 14	2203	80	8−1·5	9−2 0	11−3·0	19−0·3	20−1 0	12·6	− 2	+·6	+ ·5
Apr. 25	2214	80	8−1·5	9−2·5	11−2·5	=19	...	12·6	−·2	+ 6	+ 8
May 17	2236	...	2−1·3	3−2 0	8+1 0	9+0 7	11+1·0	10 0	0	+·6	+ ·2
June 3	2253	...	1−1·3	2+0·7	3+0·3	9+2 0	11+2·0	8·5	+ 2	+ 7	+ ·1
June 11	2261	...	1−1·3	2+1·5	3+0·7	9+2·3	11+2·3	8·1	+·2	+ 7	+ 2
June 29	2279	...	1−0·6	2+1·3	3+1·0	9+2·0	11+2·3	8·0	+·2	+·7	+ ·4
July 7	2287	...	1−0·3	2+1·7	3+1·3	8+3·0	9+2·3	7·7	+·2	+·7	+ ·2
July 23	2303	...	1+0·2	2+2·0	3+1·2	9+3 0	11+3·0	7·3	+·3	+·7	− ·2
Aug. 4	2315	...	=1	2+1·5	3+1 0	8+3 0	11+3·0	7 6	+ 2	+·7	− ·2
Aug. 21	2332	...	1−0·3	2+1·3	3+0·6	9+2·5	11+2 5	7·9	+·2	+ 7	− ·2
Sept. 5	2347	...	1−0·5	2+1·0	=3	9+2 0	11+2·0	8·3	+·1	+·7	− ·2
Sept. 24	2366	...	1−1·0	2+0·3	=3	8+2·0	9+1·3	8·8	+·1	+·7	− ·1
Oct. 11	2383	...	1−2·0 (11+1·5	2−0·2	3−1·0	8+1·5	9+1·0	9·3	0	+·7	− ·2
Oct. 21	2393	...	2−0·6	3−1·5	8+1·2	9+0·5	11+1·5	9·7	+·1	+ 6	− ·1
Nov. 3	2406	...	2−1 5	3−2·0	8+1·0	=9	11+0·5	10·3	0	+·6	· ·1
Nov. 19	2422	80	8−1 3	9−2·0	11−1·3	...	...	12 0	−·2	+·7	+1·1
Dec. 7	2440	132	8−2·0	9−3·0	11−2 5	17−0·5	18−0·5	12 6	−·2	+·6	+ ·9
Dec. 13	2446	132	8−2·5	9−3·0	11−2·5	18−1·3	19−0·3	12·9	−·2	+·6	+ ·9

1891 June 9. Not seen with 34 and 80 in twilight.

R Camelopardi—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1892 Dec. 27	2460	132	8 − 2·0	9 − 2·0	11 − 2·0	19 + 1·0	...	12·3	− ·1	+ ·6	+ ·2
1893 Jan. 4	2468	80	*g* − 2·0	*h* − 2·0	*l* − 1·0	*m* + 0·3	...	12·9	− ·1	0	...
Jan. 13	2477	132	*l* − 1·0	...	...	...	...	13·2	− ·1	0	...
Jan. 26	2490	...	*c* − 2·5	*e* − 2·0	*g* − 1·0	*h* − 0·6	...	11·7	− ·1	+ ·1	...
Feb. 8	2503	...	*b* − 2·5	*c* − 1·5	*e* − 1·0	*g* + 0·6	*h* + 0·3	10·6	0	0	...
Mar. 1	2524	...	*b* − 1·6	*c* − 1·0	= *e*	*g* + 1·5	*h* + 2·0	9·5	0	0	...
Mar. 8	2531	...	*b* − 1·5	= *c*	= *e*	*g* + 2·0	*h* + 1·5	9·4	0	0	...
Mar. 16	2539	...	*b* − 1·2	*c* + 0·5	*e* + 1·0	*g* + 2·3	*h* + 2·3	8·8	+ ·1	0	− ·1
Mar. 24	2547	...	*b* − 1·3	*c* + 0·3	*e* + 0·7	*g* + 2·0	*h* + 2·0	9·1	+ ·1	0	...
Mar. 30	2553	...	*b* − 0·7	*c* + 0·3	*e* + 1·2	*g* + 2·5	*h* + 2·5	8·6	+ ·1	0	...
Apr. 8	2562	...	*b* − 0·6	*c* + 0·3	*e* + 0·7	*g* + 2·0	*h* + 2·5	8·8	+ ·1	0	...
Apr. 25	2579	...	*b* − 0·7	*c* + 0·7	*e* + 1·2	*g* + 2·5	*h* + 3·0	8·5	+ ·1	0	...
May 5	2589	...	*b* − 0·6	*c* + 1·0	*e* + 1·5	*g* + 2·0	*h* + 2·5	8·5	+ ·1	0	...
May 21	2605	...	*b* − 1·3	*c* + 1·0	*e* + 1·0	*g* + 2·0	*h* + 2·0	8·9	+ ·1	0	− ·2
June 2	2617	...	*b* − 1·3	*c* + 0·3	*e* + 1·0	*g* + 1·6	*h* + 2·0	9·1	+ ·1	0	...
June 11	2626	...	*b* − 1·3	= *c*	*e* + 1·0	*g* + 1·7	*h* + 2·3	9·1	+ ·1	0	...
July 9	2654	...	*a* − 2·0	*c* − 1·3	*e* − 0·6	*g* + 1·0	*h* + 1·5	11·2	0	+ ·1	...
July 27	2672	...	*c* − 3·0	*e* − 2·0	*g* − 0·5	*h* + 0·5	...	11·4	0	+ ·1	...
Aug. 17	2693	...	*e* − 3·0	*g* − 2·0	*h* − 1·0	*k* + 0·5	*m* + 2·0	12·0	0	+ ·1	− ·4
Sept. 2	2709	80	*g* − 3·5	*h* − 2·5	*k* − 0·5	*m* + 1·0	...	13·0	0	+ ·1	+ ·1
Sept. 23	2730	132	*g* − 3·0	*h* − 2·0	= *m*	...	...	13·2	0	+ ·1	+ 1·0
Oct. 3	2740	80	*g* − 3·0	*h* − 2·0	*k* − 1·0	= *m*	...	13·1	− ·1	+ ·1	+ 1·5
Oct. 18	2755	80	*g* − 1·6	*h* − 1·3	*k* − 0·3	*m* + 1·0	...	12·2	0	+ ·1	+ 1·5
Nov. 5	2773	...	*c* − 2·0	*e* − 1·3	= *g*	*h* + 0·5	*k* + 1·3	10·8	0	+ ·1	+ ·9
Nov. 12	2780	...	*b* − 1·5	*c* − 2·0	*e* − 1·0	*g* + 0·7	*h* + 1·3	10·3	0	0	+ ·5
Dec. 6	2804	...	*b* − 1·0	*c* + 0·3	*e* + 1·0	*g* + 2·0	*h* + 2·0	8·9	+ ·1	0	+ ·2
Dec. 21	2819	...	*b* − 1·0	*c* + 0·6	*e* + 1·3	*g* + 2·0	*h* + 3·0	8·6	+ ·1	0	+ ·2
1894 Jan. 23	2852	...	*b* + 0·5	*c* + 1·3	*e* + 1·8	*g* + 2·3	*h* + 2·3	8·1	+ ·2	0	− ·1
Feb. 3	2863	...	*b* + 0·2	*c* + 1·3	*e* + 1·6	*g* + 2·5	*h* + 2·5	8·2	+ ·2	0	− ·2
Feb. 8	2868	...	*b* − 0·5	*c* + 1·2	*e* + 1·7	*g* + 2·3	*h* + 2·3	8·4	+ ·1	0	− ·1
Feb. 18	2878	...	*b* − 1·0	*c* + 0·7	*e* + 1·3	*g* + 2·0	*h* + 2·5	8·7	+ ·1	0	− ·1
Feb. 24	2884	...	*b* − 1·0	*c* + 0·5	*e* + 1·3	*g* + 2·0	*h* + 2·0	8·8	+ ·1	0	− ·2
Mar. 8	2896	...	*b* − 1·3	*c* + 0·2	*e* + 1·0	*g* + 2·0	*h* + 2·5	8·9	+ ·1	0	− ·5
Mar. 19	2907	...	*b* − 1·3	*c* − 0·2	*e* + 0·3	*g* + 1·5	*h* + 1·5	9·4	0	0	− ·4
Mar. 27	2915	...	*b* − 1·5	*c* − 1·0	*e* − 0·3	*g* + 1·3	*h* + 1·6	9·8	0	0	− ·3
Apr. 25	2944	...	*c* − 1·3	*e* − 2·0	*g* − 0·3	*h* + 0·3	...	11·0	0	+ ·1	− ·1
May 9	2958	...	*c* − 3·0	*e* − 2·0	*g* − 1·0	*h* − 0·3	*k* + 0·5	11·7	− ·1	+ ·1	− ·1
May 24	2973	80	*c* − 3·0	*e* − 2·5	*g* − 2·0	*h* − 1·0	*k* − 0·3	12·3	− ·1	+ ·1	+ ·1
June 28	3008	132	*h* − 2·0	= *m*	...	...	...	13·0	0	+ ·1	+ ·5

1894 June 18. Not seen with 34 and 80. Barely seen 132.

R Camelopardi—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1894 July 18	3028	...	$c-3\cdot0$	$e-2\cdot0$	$g-1\cdot0$	$h-0\cdot3$	...	11·8	−·1	+·1	+·3
Aug. 26	3067	...	$b-1\cdot0$	$c+0\cdot5$	$e+1\cdot2$	$g+2\cdot0$	$h+2\cdot5$	8·8	+·1	0	−·2
Sept. 1	3073	...	$b-0\cdot5$	$c+0\cdot6$	$e+1\cdot0$	$g+2\cdot0$	$h+2\cdot5$	8·7	+·1	0	−·1
Sept. 14	3086	...	$b-0\cdot2$	$c+0\cdot6$	$e+1\cdot0$	$g+1\cdot5$	$h+2\cdot0$	8·8	+·1	0	+·3
Sept. 27	3099	...	$=b$	$c+1\cdot0$	$e+1\cdot3$	$g+1\cdot8$	$h+1\cdot8$	8·6	+·2	0	+·4
Oct. 8	3110	...	$b-0\cdot3$	$c+1\cdot0$	$e+1\cdot5$	$g+1\cdot8$	$h+2\cdot0$	8·6	+·1	0	+·3
Oct. 22	3124	...	$b+0\cdot2$	$c+1\cdot0$	$e+1\cdot5$	$g+2\cdot0$	$h+2\cdot5$	8·4	+·2	0	+·2
Nov. 3	3136	...	$b+1\cdot0$	$c+1\cdot5$	$e+1\cdot7$	$g+1\cdot7$	$h+2\cdot0$	8·2	+·2	0	−·1
Nov. 15	3148	...	$b-0\cdot4$	$c+1\cdot0$	$e+1\cdot4$	$g+2\cdot0$	$h+2\cdot5$	8·5	+·1	0	0
Nov. 30	3163	...	$b-1\cdot0$	$c+0\cdot2$	$e+1\cdot0$	$g+1\cdot5$	$h+2\cdot0$	9·1	+·1	0	+·3
Dec. 8	3171	...	$b-1\cdot0$	$c-0\cdot3$	$e+0\cdot5$	$g+1\cdot3$	$h+2\cdot0$	9·3	0	0	+·3
Dec. 27	3190	...	$b-1\cdot3$	$c-1\cdot0$	$e+0\cdot3$	$g+1\cdot3$	$h+1\cdot6$	9·6	0	0	−·1
1895 Jan. 18	3212	...	$b-1\cdot8$	$c-1\cdot5$	$e-1\cdot0$	$=g$	$h+0\cdot5$	10·6	0	0	(−·5)
Feb. 11	3236	80	$c-2\cdot3$	$e-2\cdot3$	$g-1\cdot3$	$h-1\cdot3$	$m+1\cdot0$	11·9	−·1	+·1	...
Feb. 17	3242	...	$c-3\cdot5$	$e-2\cdot5$	$g-1\cdot3$	$h-1\cdot3$	$m+0\cdot5$	12·3	−·1	+·1	...
Mar. 4	3257	132	$m-0\cdot5$	...	...	...	...	13·2	−·1	+·3	...
Mar. 18	3271	132	$g-2\cdot0$	$h-2\cdot0$	$=m$	...	...	12·8	−·1	+·1	−·2
Mar. 28	3281	80	$e-3\cdot5$	$g-2\cdot5$	$h-1\cdot5$	$m-1\cdot0$	...	13·2	−·1	+·1	+·6
Apr. 10	3294	80	$c-3\cdot5$	$e-2\cdot0$	$g-1\cdot5$	$h-1\cdot0$	$=m$	12·3	−·1	+·1	+·3
May 1	3315	...	$b-2\cdot3$	$c-1\cdot6$	$e-1\cdot3$	$=g$	$h+0\cdot7$	10·7	0	0	−·4
May 10	3324	...	$a-1\cdot5$	$c-1\cdot2$	$e-0\cdot6$	$g+0\cdot6$	$h+1\cdot0$	10·0	0	+·1	−·6
May 27	3341	...	$b-1\cdot3$	$c-0\cdot3$	$e+0\cdot7$	$g+1\cdot3$	$h+2\cdot0$	9·3	0	0	−·6
June 5	3350	...	$b-1\cdot2$	$c-0\cdot8$	$e+0\cdot2$	$g+1\cdot5$	$h+2\cdot0$	9·5	0	0	0
June 23	3368	...	$b-1\cdot0$	$c+0\cdot5$	$e+1\cdot0$	$g+2\cdot0$	$h+2\cdot0$	8·9	+·1	0	0
July 12	3387	...	$b-0\cdot2$	$c+1\cdot0$	$e+1\cdot4$	$g+2\cdot0$	$h+2\cdot4$	8·5	+·1	0	0
July 28	3403	...	$b+0\cdot8$	$c+1\cdot3$	$e+2\cdot0$	$g+2\cdot5$	$h+3\cdot0$	7·9	+·2	0	−·3
Aug. 15	3421	...	$b+0\cdot2$	$c+1\cdot0$	$e+1\cdot3$	$g+1\cdot5$	$h+2\cdot0$	8·6	+·2	0	+·4
Aug. 28	3434	...	$=b$	$c+0\cdot8$	$e+1\cdot2$	$g+1\cdot7$	$h+2\cdot0$	8·7	+·2	0	+·3
Sept. 8	3445	...	$b-1\cdot0$	$c+0\cdot2$	$e+1\cdot2$	$g+2\cdot0$	$h+2\cdot3$	8·9	+·1	0	−·1
Sept. 25	3462	...	$b-1\cdot0$	$c-0\cdot7$	$=e$	$g+1\cdot0$	$h+1\cdot5$	9·6	0	0	−·2
Oct. 14	3481	...	$c-1\cdot3$	$e-0\cdot7$	$g+0\cdot2$	$h+1\cdot0$	...	10·4	0	+·1	−·1
Oct. 26	3493	...	$b-3\cdot0$	$c-2\cdot0$	$e-1\cdot3$	$g-0\cdot7$	$=h$	11·2	−·1	0	−·1
Nov. 9	3507	...	$c-3\cdot5$	$e-2\cdot0$	$g-1\cdot4$	$h-1\cdot0$	$m+2\cdot0$	11·9	−·1	+·1	+·1
Nov. 17	3515	132	$c-3\cdot0$	$e-2\cdot0$	$g-2\cdot0$	$h-1\cdot3$	$m+1\cdot0$	12·2	−·1	+·1	−·1
1896 Jan. 15	3574	132	$=m$	...	...	...	...	12·7	0	+·3	...
Jan. 28	3587	80	$b-3\cdot0$	$c-2\cdot3$	$e-1\cdot6$	$g-1\cdot3$	$h-1\cdot0$	11·6	−·1	0	(+·1)
Feb. 20	3610	...	$b-1\cdot6$	$c-1\cdot0$	$e-0\cdot5$	$g+0\cdot7$	$h+0\cdot7$	10·1	0	0	−·3
Feb. 26	3616	...	$b-1\cdot4$	$c-1\cdot0$	$e-0\cdot2$	$g+1\cdot0$	$h+1\cdot7$	9·8	0	0	−·3
Mar. 16	3635	...	$b-1\cdot5$	$c-1\cdot0$	$=e$	$g+1\cdot5$	$h+2\cdot0$	9·6	0	0	0
Mar. 27	3646	...	$b-1\cdot3$	$c+0\cdot5$	$e+0\cdot8$	$g+1\cdot3$	$h+1\cdot6$	9·2	+·1	0	0
Apr. 8	3658	...	$b-0\,8$	$c+0\cdot2$	$e+1\cdot0$	$g+1\cdot3$	$h+2\cdot0$	9·1	+·1	0	+·2
Apr. 19	3669	...	$b-0\cdot5$	$c+0\cdot7$	$e+1\,2$	$g+1\cdot6$	$h+2\cdot0$	8·8	+·1	0	+·1
Apr. 29	3679	...	$b-0\cdot3$	$c+1\cdot0$	$e+1\cdot3$	$g+1\cdot8$	$h+2\cdot0$	8·6	+·1	0	+·1
May 8	3688	...	$b+0\cdot4$	$c+1\cdot2$	$e+1\cdot5$	$g+1\cdot7$	$h+2\cdot0$	8·4	+·2	0	+·2

1895 Dec. 7. Not visible 34, 80, 132; nor on Jan. 4.

R Camelopardi—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1896 May 14	3694	...	$b+0.3$	$c+1.2$	$e+1.6$	$g+2.0$	$h+2.3$	8·3	+·2	0	+·2
May 21	3701	...	$b+0.6$	$c+1.4$	$e+2.3$	$g+3.0$	...	7·7	+·2	0	−·3
May 28	3708	...	$b+0.5$	$c+1.2$	$e+1.4$	$g+1.6$	$h+1.8$	8·5	+·2	0	+·4
June 11	3722	...	$b-0.6$	$c+1.0$	$e+1.4$	$g+2.0$	...	8·5	+·1	0	0
June 21	3732	...	$b-1.3$	$c+0.3$	$e+0.6$	$g+1.3$	...	9·3	+·1	0	+·3
July 18	3759	...	$b-2.0$	$c-1.5$	$e-0.7$	$=g$	$h+1.0$	10·4	0	0	−·1
Aug. 3	3775	...	$b-3.0$	$c-2.0$	$e-1.3$	$g-0.7$	$=h$	11·2	−·1	0	−·5
Aug. 18	3790	80	$e-3.0$	$g-2.0$	$h-1.0$	$k-0.5$	$m+0.5$	12·5	−·1	+·1	−·1
Sept. 10	3813	80	$c-4.0$	$e-3.0$	$g-2.0$	$h-1.5$	$=m$	12·8	−·1	+·1	−·4
Oct. 27	3860	...	$c-3.0$	$e-2.0$	$g-2.0$	$h-1.3$	$m+1.0$	12·2	−·1	+·1	+·2
Nov. 4	3868	...	$c-2.5$	$e-1.5$	$g-1.0$	$h-0.3$	...	11·5	−·1	+·1	+·1
Nov. 20	3884	...	$b-2.0$	$c-1.5$	$e-0.3$	$g+1.0$	$h+1.5$	10·1	0	0	−·2
Dec. 7	3901	...	$b-1.3$	$c-0.2$	$e+0.8$	$g+1.3$	$h+1.3$	9·4	0	0	−·1
Dec. 17	3911	...	$b-1.4$	$c-0.5$	$=e$	$g+1.5$	$h+2.0$	9·5	0	0	+·3
1897 Jan. 1	3926	...	$b-0.6$	$c+0.3$	$e+1.0$	$g+1.7$	$h+1.7$	9·0	+·1	0	+·3
Jan. 14	3939	...	$b-0.5$	$c+1.3$	$e+1.6$	$g+2.0$	$h+2.5$	8·4	+·1	0	0
Jan. 23	3948	...	$b+0.2$	$c+1.5$	$e+1.5$	$g+2.3$	$h+2.3$	8·2	+·2	0	0
Feb. 6	3962	...	$b+0.7$	$c+1.5$	$e+1.5$	$g+2.3$	$h+2.3$	8·1	+·2	0	+·1
Feb. 17	3973	...	$b+0.2$	$c+1.0$	$e+1.4$	$g+1.8$	$h+1.8$	8·6	+·2	0	+·5
Mar. 6	3990	...	$b-0.4$	$c+1.2$	$e+1.6$	$g+2.0$	$h+2.0$	8·5	+·1	0	+·1
Mar. 22	4006	...	$b-1.3$	$c+0.5$	$e+1.0$	$g+2.3$	$h+2.3$	8·8	+·1	0	−·4
Apr. 15	4030	...	$b-2.5$	$c-1.8$	$e-1.0$	$=g$	$h+0.6$	10·7	0	0	+·1
May 5	4050	...	$c-3.0$	$e-2.0$	$g-1.0$	$h-0.2$	$=h$	11·7	−·1	+·1	(+·1)
May 18	4063	80	$c-4.0$	$e-3.0$	$g-2.0$	$h-1.0$	$m-0.2$	12·6	−·1	+·1	(+·4)
June 2	4078	132	$c-3.0$	$e-2.0$	$g-1.5$	$h-1.5$	...	12·2	−·1	+·1	(−·5)
June 16	4092	132	$g-3.0$	$h-2.0$	$m-1.0$	...	...	13·5	−·1	+·1	(+·7)
July 26	4132	80	$c-4.0$	$e-3.0$	$g-2.0$	$h-1.5$	...	12·8	−·1	+·1	+·3
Aug. 12	4149	...	$b-2.5$	$c-2.0$	$e-1.3$	$=g$	$h+0.6$	10·8	0	0	−·1
Aug. 25	4162	...	$b-1.7$	$c-1.2$	$e-0.2$	$g+1.0$	$h+1.3$	10·0	0	0	0
Sept. 3	4171	...	$b-1.5$	$c-1.0$	$e+0.3$	$g+1.0$	$h+1.3$	9·8	0	0	+·3
Sept. 12	4180	...	$b-1.3$	$c-0.7$	$e+0.3$	$g+1.7$	$h+2.3$	9·3	0	0	+·1
Sept. 19	4187	...	$b-1.2$	$c+0.2$	$e+1.0$	$g+1.7$	$h+2.3$	9·0	+·1	0	+·1
Sept. 26	4194	...	$b-1.0$	$c+0.3$	$e+1.2$	$g+1.7$	$h+2.3$	8·9	+·1	0	+·1
Oct. 12	4210	...	$b-1.2$	$c+0.5$	$e+1.2$	$g+2.5$	$h+3.0$	8·6	+·1	0	+·1
Oct. 21	4219	...	$b+0.4$	$c+1.2$	$e+1.8$	$g+2.3$	$h+2.3$	8·2	+·2	0	0
Nov. 2	4231	...	$b+1.2$	$c+1.5$	$e+2.3$	$g+3.0$	$h+3.5$	7·5	+·2	0	−·6
Nov. 25	4254	...	$=b$	$c+1.5$	$e+1.8$	$g+2.5$	$h+3.0$	8·0	+·2	0	−·3
Dec. 3	4262	...	$b-0.3$	$c+1.3$	$e+1.8$	$g+2.0$	$h+2.7$	8·3	+·1	0	−·6
Dec. 20	4279	...	$b-1.3$	$=c$	$e+1.0$	$g+1.5$	$h+2.0$	9·2	+·1	0	−·2
1898 Jan. 3	4293	...	$b-2.2$	$c-1.5$	$e-0.5$	$g+1.0$	$h+1.0$	10·2	0	0	+·1
Feb. 2	4323	80	$b-3.5$	$c-2.5$	$e-2.0$	$g-1.0$	$h-1.0$	11·8	−·2	0	+·1
Feb. 19	4340	80	$c-3.0$	$e-2.0$	$g-1.0$	$h-1.0$	...	12·0	−·2	+·1	−·7
Mar. 11	4360	...	$c-5.0$	$e-4.0$	$g-3.0$	$h-3.0$	$m-0.3$	13·8	−·2	+·1	(+·5)
Mar. 21	4370	...	$g-2.0$	$h-1.5$	$m-0.5$	...	...	12·8	−·2	+·1	(−·6)

1896 Sept. 18. Barely visible. Moonlight. Sept. 27 not seen 34 and 80; a most minute point 132; so also on Oct. 9.
1897 July 12. Not seen 34, 80, 132. Twilight and Full Moon.

R CAMELOPARDI—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1898 Apr. 5	4385	132	$c-4\cdot0$	$e-3\cdot0$	$g-2\cdot0$	$h-2\cdot0$	...	13·0	−·2	+·1	(−·3)
Apr. 29	4409	80	$c-3\cdot0$	$e-2\cdot5$	$g-2\cdot0$	$h-1\cdot0$	...	12·3	−·2	+·1	+·1
May 12	4422	...	$b-2\cdot5$	$c-1\cdot5$	$e-1\cdot0$	$g+0\cdot5$	$h+1\cdot0$	10·5	0	0	−·4
May 23	4433	...	$b-2\cdot0$	$c-1\cdot3$	$e-0\cdot5$	$g+0\cdot7$	$h+1\cdot5$	10·1	0	0	−·3
June 7	4448	...	$b-1\cdot5$	$c-0\cdot5$	$e+0\cdot5$	$g+1\cdot3$	$h+2\cdot0$	9·4	+·1	0	−·2
June 16	4457	...	$b-1\cdot3$	$c-0\cdot3$	$e+0\cdot7$	$g+1\cdot3$	$h+2\cdot3$	9·3	+·1	0	0
June 25	4466	...	$b-1\cdot3$	$c+0\cdot7$	$e+1\cdot2$	$g+1\cdot5$	$h+2\cdot0$	9·0	+·2	0	0
July 5	4476	...	$b-1\cdot3$	$c+1\cdot0$	$e+1\cdot6$	$g+2\cdot3$	$h+2\cdot7$	8·5	+·2	0	−·3
July 14	4485	...	$b-1\cdot3$	$c+1\cdot0$	$e+1\cdot5$	$g+1\cdot7$	$h+2\cdot3$	8·8	+·2	0	+·2
July 30	4501	...	$b-0\cdot7$	$c+1\cdot2$	$e+1\cdot8$	$g+2\cdot5$	$h+3\cdot0$	8·2	+·2	0	−·2
Aug. 8	4510	...	$b-0\cdot6$	$c+0\cdot8$	$e+1\cdot5$	$g+2\cdot0$	$h+3\cdot0$	8·5	+·2	0	+·1
Aug. 20	4522	...	$b+0\cdot3$	$c+1\cdot3$	$e+1\cdot7$	$g+2\cdot3$	$h+2\cdot6$	8·2	+·3	0	−·2
Sept. 1	4534	...	$b-0\cdot2$	$c+1\cdot3$	$e+2\cdot0$	$g+2\cdot5$	$h+3\cdot0$	8·1	+·2	0	−·5
Sept. 14	4547	...	$b-1\cdot0$	$c+0\cdot3$	$e+1\cdot3$	$g+1\cdot7$	$h+2\cdot3$	8·9	+·2	0	0
Sept. 23	4556	...	$b-1\cdot0$	$c+0\cdot2$	$e+1\cdot0$	$g+1\cdot8$	$h+2\cdot0$	9·0	+·2	0	−·2
Oct. 9	4572	...	$b-1\cdot7$	$c-1\cdot2$	$e-1\cdot2$	$g+1\cdot3$	$h+1\cdot6$	10·0	0	0	+·2
Oct. 23	4586	...	$b-3\cdot0$	$c-2\cdot3$	$e-1\cdot0$	$=g$	$h+1\cdot0$	10·9	−·1	0	+·6
Nov. 5	4599	...	$b-3\cdot0$	$c-2\cdot5$	$e-2\cdot0$	$g-1\cdot0$	$h-0\cdot5$	11·6	−·2	0	+·9
Nov. 18	4612	...	$c-3\cdot0$	$e-2\cdot5$	$g-2\cdot0$	$h-1\cdot5$	$m+1\cdot0$	12·3	−·1	+·1	...
Dec. 13	4637	132	$c-4\cdot0$	$e-3\cdot0$	$g-2\cdot0$	$h-1\cdot5$	...	12·8	−·2	+·1	...
1899 Jan. 28	4683	80	$c-3\cdot0$	$e-2\cdot5$	$g-1\cdot2$	$h-1\cdot2$	$m+1\cdot0$	12·1	−·1	+·1	...
Feb. 13	4699	...	$b-3\cdot0$	$c-2\cdot3$	$e-2\cdot0$	$g+1\cdot5$	$h+1\cdot0$	10·8	0	0	+·5
Feb. 21	4707	...	$b-2\cdot5$	$c-1\cdot2$	$e-0\cdot2$	$g+2\cdot0$	$h+2\cdot0$	9·8	−·1	0	−·4
Feb. 25	4711	...	$b-2\cdot2$	$c-1\cdot0$	$e-0\cdot5$	$g+1\cdot5$	$h+1\cdot5$	9·9	−·1	0	−·2
Mar. 9	4723	...	$b-2\cdot0$	$=c$	$e+1\cdot0$	$g+2\cdot0$	$h+2\cdot0$	9·2	+·1	0	−·4
Mar. 15	4729	...	$b-1\cdot5$	$=c$	$e+0\cdot5$	$g+2\cdot0$	$h+2\cdot0$	9·2	+·1	0	−·2
Mar. 24	4738	...	$b-1\cdot5$	$c+0\cdot3$	$e+1\cdot0$	$g+2\cdot0$	$h+2\cdot5$	8·9	+·2	0	−·3
Apr. 7	4752	...	$b-1\cdot0$	$c+0\cdot3$	$e+1\cdot0$	$g+2\cdot5$	$h+2\cdot5$	8·7	+·2	0	−·3
Apr. 15	4760	...	$b-1\cdot0$	$c+0\cdot3$	$e+1\cdot0$	$g+2\cdot0$	$h+3\cdot0$	8·7	+·2	0	−·2
May 2	4777	...	$b-0\cdot5$	$c+1\cdot3$	$e+2\cdot3$	$g+3\cdot0$	$h+3\cdot0$	8·0	+·2	0	−·7
May 22	4797	...	$b-1\cdot0$	$c+1\cdot5$	$e+2\cdot0$	$g+3\cdot0$	$h+3\cdot3$	8·0	+·2	0	−·5
May 28	4803	...	$b-1\cdot0$	$c+1\cdot0$	$e+1\cdot0$	$g+2\cdot0$	$h+2\cdot5$	8·7	+·2	0	+·2
June 6	4812	...	$b-1\cdot3$	$c+0\cdot3$	$e+1\cdot0$	$g+1\cdot5$	$h+2\cdot5$	9·0	+·2	0	+·5
June 16	4822	...	$b-1\cdot5$	$c+0\cdot7$	$e+1\cdot3$	$g+2\cdot0$	$h+2\cdot7$	8·8	+·2	0	+·2
July 4	4840	...	$b-2\cdot0$	$c-1\cdot0$	$e+0\cdot3$	$g+1\cdot8$	$h+2\cdot3$	9·5	+·1	0	−·3
July 16	4852	...	$c-2\cdot0$	$e-1\cdot0$	$g+1\cdot0$	$h+1\cdot5$	...	10·3	0	+·1	−·6
Aug. 6	4873	...	$b-4\cdot0$	$c-3\cdot0$	$e-2\cdot0$	$g-1\cdot5$	$h-1\cdot0$	12·1	−·2	0	...
Aug. 12	4879	80	$c-4\cdot0$	$e-3\cdot0$	$g-2\cdot0$	$h-1\cdot0$	$k-0\cdot3$	12·6	−·2	+·1	...
Aug. 18	4885	132	$c-3\cdot7$	$e-3\cdot0$	$g-2\cdot0$	$h-1\cdot7$	$k-0\cdot5$	12·7	−·2	+·1	...
Aug. 23	4890	132	$c-4\cdot0$	$c-2\cdot7$	$g-2\cdot0$	$h-1\cdot0$	$k-0\cdot5$	12·5	−·2	+·1	...
Sept. 3	4901	80	$c-3\cdot5$	$e-2\cdot7$	$g-2\cdot0$	$h-1\cdot5$	$k-1\cdot0$	12·6	−·2	+ 1	...
Sept. 26	4924	132	$e-4\cdot0$	$g-3\cdot0$	$h-2\cdot0$	$m-1\cdot0$	...	13·6	−·2	+·1	...
Oct. 2	4930	80	$c-4\cdot0$	$e-3\cdot0$	$g-2\cdot5$	$h-1\cdot5$	$m+0\cdot5$	12·8	−·1	+ 1	...
Oct. 9	4937	132	$c-4\cdot0$	$e-3\cdot0$	$g-2\cdot0$	$h-2\cdot0$	$m+0\cdot3$	12·8	− 1	+ 1	...

1898 Dec. 30. Not seen 34, 80, 132; nor on Jan. 11.

R CAMELOPARDI—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1899 Oct. 17	4945	132	$c-4\cdot0$	$e-3\cdot0$	$g-2\cdot0$	$h-1\cdot5$	...	12·8	−·2	+·1	...
Oct. 24	4952	...	$b-4\cdot0$	$c-3\cdot5$	$e-2\cdot7$	$g-2\cdot0$	$h-1\cdot0$	12·4	−·2	0	...
Nov. 13	4972	...	$b-2\cdot5$	$e-2\cdot0$	$e-1\cdot0$	$g+1\cdot5$	$h+2\cdot0$	10·2	0	0	+·5
Nov. 26	4985	...	$b-2\cdot0$	$c-1\cdot0$	$e-0\cdot2$	$g+1\cdot7$	$h+2\cdot0$	9·7	−·1	0	+·5
Dec. 14	5003	...	$b-1\cdot3$	$c+0\cdot2$	$e+1\cdot2$	$g+2\cdot5$	$h+3\cdot0$	8·7	+·1	0	0
Dec. 25	5014	...	$b-1\cdot3$	$c+1\cdot0$	$e+1\cdot5$	$g+2\cdot3$	$h+2\cdot5$	8·6	+·2	0	...
											G.M.T. h m
1900 Jan. 5	5025	...	$b-1\cdot0$	$c+0\cdot7$	$e+1\cdot5$	$g+2\cdot7$	$h+3\cdot0$	8·4	+·2	0	...
Jan. 16	5036	...	$b-0\cdot6$	$c+1\cdot7$	$e+2\cdot3$	$g+3\cdot0$	$h+3\cdot0$	7·9	+·2	0	...
Jan. 24	5044	...	$b+0\cdot3$	$c+3\cdot0$	$e+2\cdot5$	$g+4\cdot0$	$h+4\cdot0$	7·0	+·3	0	...
Feb. 1	5052	...	$b+1\cdot0$	$c+2\cdot0$	$e+3\cdot0$	$g+4\cdot3$	$h+4\cdot3$	6·9	+·3	0	...
Feb. 6	5057	...	$b+1\cdot0$	$c+2\cdot0$	$e+2\cdot0$	$g+3\cdot0$	$h+3\cdot0$	7·6	+·3	0	...
Feb. 17	5068	...	$b+1\cdot0$	$c+2\cdot5$	$e+2\cdot5$	$g+3\cdot0$	$h+3\cdot0$	7·4	+·3	0	...
Mar. 1	5080	...	$b+0\,5$	$c+3\cdot0$	$e+3\cdot0$	$g+4\cdot0$	$h+4\cdot0$	6·9	+·3	0	...
Mar. 12	5091	...	$b-1\cdot3$	$c+1\cdot0$	$e+1\cdot8$	$g+3\cdot0$	$h+3\cdot0$	8·3	+·2	0	...
Mar. 17	5096	...	$b-1\cdot3$	$c+0\,2$	$e+1\cdot2$	$g+2\cdot0$	$h+2\cdot4$	8·9	+·2	0	9 20
Mar. 26	5105	...	$b-1\cdot5$	$c-0\cdot5$	$e+0\cdot5$	$g+2\cdot0$	$h+2\cdot5$	9·2	+·1	0	9 50
Apr. 16	5126	...	$c-1\cdot5$	$e-1\cdot0$	$g+0\cdot8$	$h+1\cdot2$	$m+1\cdot5$	10·5	0	+·1	9 50
Apr. 28	5138	...	$c-2\cdot0$	$e-1\cdot3$	$g-1\cdot0$	$h-0\cdot2$	...	11·3	−·2	+·1	9 30
May 24	5164	132	$c-3\cdot5$	$e-2\cdot5$	$g-2\cdot0$	$h-1\cdot0$	...	12·5	−·2	+·1	9 50
July 17	5218	132	$g-2\cdot0$	$h-2\cdot0$	$m-0\cdot5$	...	...	13·0	−·2	+·1	10 10
Aug. 5	5237	...	$c-3\cdot0$	$e-2\cdot0$	$g-1\cdot5$	$h-0\cdot8$	...	12·0	−·2	+·1	9 50
Aug. 12	5244	...	$b-2\cdot5$	$c-2\cdot3$	$e-1\cdot3$	$g+0\cdot3$	$h+1\cdot2$	10·7	0	0	9 10
Aug. 23	5255	...	$b-3\cdot0$	$c-2\cdot0$	$e-1\,0$	$g+0\cdot7$	$h+1\cdot2$	10 6	0	0	10 0
Aug. 31	5263	...	$b-2\cdot5$	$c-1\cdot5$	$e-0\cdot5$	$g+1\cdot0$	$h+1\cdot5$	10·2	0	0	9 30
Sept. 8	5271	...	$b-2\cdot3$	$c-1\cdot2$	$e-0\cdot2$	$g+1\cdot3$	$h+1\cdot7$	9·9	0	0	10 10
Sept. 15	5278	...	$b-1\cdot5$	$c-0\cdot7$	$e+0\cdot3$	$g+1\cdot5$	$h+2\cdot0$	9·5	+·1	0	9 50
Sept. 24	5287	...	$b-1\cdot5$	$c-0\cdot7$	$e+0\cdot5$	$g+1\cdot7$	$h+2\cdot2$	9·4	+·1	0	10 0
Oct. 8	5301	...	$b-1\cdot5$	$c+1\cdot0$	$e+2\cdot0$	$g+2\cdot5$	$h+3\cdot0$	8·4	+·2	0	7 40
Oct. 17	5310	...	$b-1\cdot0$	$c+1\cdot6$	$e+2\cdot0$	$g+3\cdot0$	$h+4\cdot0$	7·9	+·2	0	7 40
Oct. 26	5319	...	$b+0\cdot2$	$c+2\cdot0$	$e+2\,7$	$g+3\cdot5$	$h+3\cdot5$	7·4	+·3	0	9 20
Nov. 8	5332	...	$b+0\cdot6$	$c+1\cdot7$	$e+2\cdot2$	$g+2\cdot8$	$h+3\cdot0$	7·7	+·3	0	9 50
Nov. 15	5339	...	$b+1\cdot0$	$c+2\cdot3$	$e+3\cdot0$	$g+3\cdot7$	$h+4\cdot0$	7·0	+·3	0	6 40
Nov. 22	5346	...	$b+1\cdot0$	$c+2\cdot0$	$e+2\cdot7$	$g+3\cdot3$	$h+4\cdot0$	7·2	+ 3	0	7 10
Nov. 29	5353	...	$b-0\cdot3$	$c+1\,3$	$e+1\cdot7$	$g+2\cdot7$	$h+3\cdot0$	8·1	+·2	0	7 0
Dec. 10	5364	...	$b-1\cdot5$	$c-1\cdot0$	$=e$	...	...	9·9	−·2	+·1	8 40
Dec. 19	5373	...	$b-1\cdot7$	$c-0\cdot7$	$e+0\cdot5$	$g+2\cdot0$	$h+2\,3$	9·3	+·1	0	8 0

1900 June 26. 10 30 G.M.T. Not seen 34, 80, 132.

S Coronæ.

R. A. $15^h\ 17^m\ 3^s$. Dec. $+31°\ 4'$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1887 Mar. 16	0347	...	3−1·0	17+1·0	...	...	...	8·3	0	−·4	...
Apr. 2	0364	...	3+0·2	...	...	...	...	7·3	+·3	−·5	...
Apr. 9	0371	...	3+0·5	...	...	...	...	7·0	+·3	−·5	...
Apr. 20	0382	...	1+1·5	=3	17+2·0	18+1·0	...	7·4	+·2	−·2	...
May 13	0405	...	3−0·5	17+2·0	18+1·7	...	...	7·2	+·1	−·4	...
June 9	0432	...	1+1·3	3−2·0	12+1·5	17+0·5	=18	8·5	+·1	−·3	...
June 27	0450	...	8+3·0	10+2·0	12+1·0	=17	18−1·0	8·6	+·1	−·2	...
July 16	0469	...	1+0·5	4+0·7	12+0·7	17−1·5	...	9·1	+·1	−·3	...
Aug. 8	0492	...	4−0·6	8+1·5	9+1·5	10+0·7	12−1·0	9·7	+·1	0	...
Aug. 18	0502	...	10+0·5	15+0·2	...	...	...	9·6	+·3	+·2	...
Sept. 18	0533	...	=10	11+1·0	13+1·0	14+1·0	=15	9·9	+·1	+·1	...
Oct. 10	0555	...	{=2 10−0·5	=6	7+0·5	8+0·5	=9}	10·6	0	+·2	...
Oct. 19	0564	132	7+0·4	8+0·2	10−0·8	...	...	10·8	+·1	+·1	...
Nov. 1	0577	132	=8	10−1·5	...	...	...	11·3	−·1	+·2	...
Nov. 19	0595	132	7−0·5	8−0·5	10−2·0	=11	...	11·6	−·2	+·1	...
1888 Mar. 4	0701	...	1+0·5	4+1·5	12+2·0	17+0·5	18−1·0	8·3	+·2	−·2	...
Mar. 30	0727	...	1+3·0	3+0·5	17+2·0	18+1·5	...	6·7	+·3	−·2	...
Apr. 11	0739	...	1+2·5	3+1·0	17+2·5	18+2·0	...	6·5	+·3	−·2	...
Apr. 25	0753	...	1+4·0	3+1·0	17+3·0	18+2·5	...	5·9	+·3	− 2	...
May 3	0761	...	3+0·5	17+2·0	18+1·5	...	...	7·0	+·3	− 4	...
May 14	0772	...	1+3·2	3+1·0	17+3·0	18+2·0	...	6·2	+·3	−·2	...
May 23	0781	...	1+3·0	3−0·5	17+2·5	18+1·5	...	6·9	+·2	−·2	...
June 10	0799	...	1+3·0	3−1·0	17+2·0	18+1·3	...	7·2	+·2	−·2	...
July 8	0827	...	=1	3−1·5	=17	18−0·5	...	9·0	−·2	− 2	...
July 20	0839	...	1+1·2	4+1·3	12+1·0	17+0·5	=18	8·2	+·2	−·2	...
Aug. 9	0859	...	=1	4+0·5	=12	17−0·5	18−1·0	9·2	−·1	−·2	...
Aug. 26	0876	...	=4	8+2·5	10+1·5	12−0·3	15+1·0	9·0	+·1	+·1	...
Sept. 7	0888	...	{4−0·5 16+1·5	8+2·0	10+0·6	12−1·0	15+0·6}	9·5	+·1	+·2	...
Sept. 18	0899	...	4−1·3	10+1·0	12−1·8	15+1·5	...	9·8	0	0	...
Oct. 6	0917	...	{2+0·5 10−0·5	=6	7+1·0	8+1·0	=9}	10·4	+·1	+·2	...
Oct. 22	0933	...	2−0·5	6−1·0	=7	=8	10−2·0	11·4	−·1	+·2	...
Nov. 26	0968	...	8−1·0	36−1·0	37−0·5	...	...	12·4	−·2	+·1	...
1889 Mar. 11	1073	...	1+0·5	3−2·0	4+1·0	17−0·5	18−1·0	9·0	−·1	−·2	...
Mar. 25	1087	...	1+2·5	=3	17+2·0	18+1·5	...	7·0	+·2	−·2	...
Apr. 5	1098	...	1+3·0	3+0·7	17+3·0	18+2·0	...	6·3	+·3	−·2	...
Apr. 10	1103	...	1+4·0	3+1·0	17+3·0	18+2·0	...	6·0	+·3	−·2	...
Apr. 18	1111	...	1+3·7	3+0·6	17+3·0	18+2·0	...	6·2	+·3	−·2	...
Apr. 27	1120	...	1+4·0	3+0·5	17+3·0	18+2·0	...	6·1	+·3	−·2	...
May 4	1127	...	1+3·5	=3	17+3·0	18+2·0	...	6·4	+·2	−·2	...
May 20	1143	...	1+2·7	3−0·5	17+2·0	18+1·0	...	7·2	+·2	−·2	...

S Coronæ—*continued*.

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1889 June 4	1158	...	1+2·0	3−1·5	17+0·7	18+0·5	...	8·1	+·2	−·2	...
June 13	1167	...	1+2·0	3−2·0	17+0·7	18+0·2	...	8·3	+·2	−·2	...
July 2	1186	...	4−0·2	12−0·5	17−1·3	18−2·0	...	10·0	−·3	−·2	...
July 17	1201	...	1−0·5	4+0·5	12−0·5	17−1·5	18−2·5	9·9	−·2	−·2	...
July 31	1215	...	4−0·7	8+2·0	10+1·0	12−1·3	15+0·7	9·6	+·1	+·1	...
Aug. 13	1228	...	4−1·5	10+0·3	12−2·0	=15	16+1·5	10·2	0	+·1	...
Sept. 6	1252	...	4−1·3	8+0·3	10−0·5	12−2·0	...	10·7	−·1	0	...
Sept. 17	1263	...	2+0·7	=6	8+0·5	10−1·5	=16	10·7	0	+·3	...
Oct. 18	1294	...	=7	8−0·5	10−1·0	=37	...	11·4	−·1	+·1	...
Oct. 20	1296	80	7−1·0	8−1·0	10−2·0	21−0·5	...	12·1	−·2	+·1	...
Nov. 25	1332	132	8−2·0	10−3·0	...	...	...	13·0	−·2	+·2	...
1890 Mar. 3	1430	...	4−1·3	10+0·5	12−1·3	15+0·5	...	10·0	0	0	...
Mar. 16	1443	...	=4	10+2·0	12+0·5	15+2·0	17−0·5	8·7	+·1	−·1	...
Mar. 23	1450	...	1+1·0	4+1·5	12+2·0	17+0·2	18−0·7	8·2	+·2	−·2	...
Mar. 29	1456	...	{ 1+0·5 =18	3−1·0	4+1·5	12+1·5	17+0·5 }	8·3	+·2	−·2	...
Apr. 8	1466	...	1+1·5	3−1·0	4+2·0	17+1·0	18+0·5	7·8	+·2	−·2	...
Apr. 22	1480	...	1+1·5	3−1·0	12+2·0	17+0·8	18+1·0	7·8	+·2	−·3	...
Apr. 28	1486	...	1+2·0	3−0·5	12+3·0	17+1·0	18+1·0	7·4	+·2	−·3	...
May 5	1493	...	1+1·5	3−1·0	12+1·7	17+1·0	18+0·7	7·9	+·2	−·3	...
May 12	1500	...	1+2·0	3−0·2	12+2·3	17+1·5	18+1·0	7·4	+·2	−·3	...
May 24	1512	...	1+1·7	3−1·5	12+2·3	17+1·5	18+1·0	7·7	+·2	−·3	...
June 15	1534	...	1+0·5	4+1·4	12+1·0	17−0·5	18−1·3	8·8	+·1	−·2	...
July 6	1555	...	1−0·5	=4	8+2·0	10+1·3	12−0·3	9·2	0	0	...
July 23	1572	...	8+1·5	10+0·8	15+0·6	16+1·5	...	9·3	+·3	+·3	...
Aug. 12	1592	...	6+0·5	8+1·2	10+0·7	15−1·0	16+1·0	9·9	+·2	+·3	...
Aug. 31	1611	...	8+1·0	10−0·5	11+1·0	15−0·5	16+1·0	10·1	0	+·2	...
Sept. 9	1620	...	2+0·5	=6	8+0·5	10−1·0	16+0·2	10·6	+·1	+·3	...
Sept. 25	1636	...	8+0·3	10−1·0	...	...	...	10·8	0	+·2	...
Oct. 8	1649	...	=2	6−0·5	8+0·2	15−1·2	16−0·5	11·0	−·1	+·4	...
Nov. 1	1673	132	2−1·3	6−2·0	8−1·0	16−1·5	37−0·5	12·3	−·2	+·2	...
1891 Mar. 28	1820	...	1+2·5	3−0·6	17+2·0	18+1·3	...	7·2	+·2	−·2	...
Apr. 15	1838	...	1+2·0	3−0·7	4+2·3	17+2·0	18+1·3	7·2	+·2	−·2	...
Apr. 23	1846	...	1+2·3	3−0·7	12+2·5	17+2·0	18+1·5	7·1	+·2	−·3	...
May 2	1855	...	{ 1+1·0 =18	3−1·0	4+0·5	12+0·5	17+0·5 }	8·5	+·2	−·2	...
May 12	1865	...	1+1·3	3−1·5	12+1·3	17+1·0	18+0·5	8·2	+·2	−·3	...
June 7	1891	...	1+1·0	3−1·5	12+1·3	17+0·5	18−0·5	8·5	+·1	−·3	...
July 3	1917	...	1+0·6	4+0·2	12−0·5	17−1·0	18−1·5	9·4	−·1	−·2	...
July 15	1929	...	=1	8+1·8	10+1·3	17−1·0	18−1·5	9·4	0	0	...
Aug. 19	1964	...	4−1·3	8+1·5	10+1·0	12−1·6	15+1·2	9·7	+·1	+·1	...
Sept. 2	1978	...	6+0·5	8+1·0	10−0·5	=15	16+1·0	10·0	+·1	+·3	...
Sept. 14	1990	...	6+0·5	8+0·6	10−0·7	15−0·4	16+0·4	10·3	0	+·3	...
Oct. 4	2010	80	8−0·5	10−1·5	11−0·5	15−1·7	16−1·0	11·5	−·2	+·2	...
Oct. 24	2030	80	2−0·6	6−1·3	8−1·0	36+0·2	=37	11·8	−·1	+·2	...
Nov. 2	2039	132	8−1·0	10−2·0	...	...	...	12·0	−·2	+·2	...

S CORONÆ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1892 Mar. 19	2177	...	1+3·0	3+0·6	4+3·0	17+2·5	18+1·5	6·5	+·3	−·2	...
Mar. 30	2188	...	1+2·5	3+0·5	12+3·0	17+2·0	18+1·5	6·8	+·3	−·3	...
Apr. 5	2194	...	1+2·3	3+0·3	12+2·5	17+2·0	18+1·5	7·0	+·3	−·3	...
Apr. 16	2205	...	1+2·3	3+0·3	12+2·5	17+1·4	18+1·0	7·2	+·3	−·3	...
May 17	2236	...	1+2·0 18+0·7	3−1·0	10+3·0	12+2·0	17+1·0	7·6	+·2	−·2	...
June 3	2253	...	1+1·0 18−0·5	3−1·5	4+1·7	12+1·5	17+0·5	8·3	+·1	−·2	...
June 23	2273	...	1+1·0	4+1·0	10+1·7	17−0·6	18−1·5	8·8	+·1	−·1	...
July 7	2287	...	1+0·3	10+1·3	15+1·3	17−1·0	18−1·3	9·2	+·1	0	...
July 28	2308	...	1−1·0	4−1·0	8+2·0	10+1·0	15+1·0	10·2	0	+·2	...
Aug. 16	2327	...	1−1·0	4−1·3	8+1·0	=10	=15	10·1	0	+·2	...
Aug. 24	2335	...	6+1·0	8+1·0	10−0·2	=15	16+1·0	9·8	+·1	+·3	...
Sept. 5	2347	...	8+1·0	=10	=15	16+1·0	...	9·9	+·1	+·3	...
Sept. 24	2366	...	2+0·3	8+0·3	10−1·0	15−1·0	=16	10·8	0	+·3	...
Oct. 10	2382	...	=2	6−0·7	=8	10−1·5	16−0·5	11·1	−·1	+·3	...
Oct. 21	2393	...	2−0·5	8−0·7	10−2·0	15−1·3	16−0·7	11·5	−·2	+·3	...
Nov. 7	2410	132	2−0·8	8−0·5	10−1·5	15−2·0	16−0·8	11·6	−·2	+·3	...
Nov. 19	2422	132	2−1·0	8−1·0	10−2·0	15−2·5	16−1·0	12·0	−·2	+·3	...
1893 Mar 4	2527	...	1+1·3	3−1·0	12+1·5	17+1·0	18+0·2	8·1	+·1	−·3	...
Mar. 11	2534	...	1+1·5	3−0·7	12+1·5	17+1·0	18+0·3	8·0	+·1	−·3	...
Mar. 18	2541	...	1+1·3	3−1·0	12+1·5	17+1·0	18+0·7	8·0	+·1	−·3	...
Mar. 29	2552	...	1+2·0	3+0·4	12+2·5	17+1·7	18+1·2	7·1	+·2	−·3	...
Apr. 8	2562	...	1+2·3	3+0·6	4+2·3	17+2·0	18+1·5	6·9	+·2	−·2	...
Apr. 24	2578	...	1+1·5	3−0·7	12+1·5	17+1·5	18+1·2	7·7	+·1	−·3	...
May 6	2590	...	1+2·0	3−0·7	12+2·0	17+1·6	18+1·3	7·5	+·1	−·3	...
May 22	2606	...	1+1·6	3−1·2	12+1·6	17+1·5	18+0·8	7·8	+·1	−·3	...
June 2	2617	...	1+1·0	3−1·3	12+1·5	17+·06	18+0·2	8·3	+·1	−·3	...
June 11	2626	...	1+1·3	10+2·3	12+1·3	17+0·8	18−0·5	8·2	+·1	−·2	...
July 9	2654	...	3−1·3	4+0·6	10+1·3	12−0·6	15+1·0	9·0	0	−·1	...
July 27	2672	...	1−0·5	4−0·5	8+2·0	10+1·0	12−1·0	9·5	0	0	...
Aug. 14	2690	...	8+1·5	10−0·5	14+1·0	15+1·0	16+1·5	9·6	+·1	+·2	...
Sept. 2	2709	...	6−1·0	8+0·7	10−1·3	15−1·0	16+1·5	10·6	0	+·3	...
Sept. 23	2730	...	=6	8−0·3	10−1·5	15−1·5	16−0·5	11·2	−·1	+·3	...
Oct. 7	2744	...	6−1·0	8−0·5	10−2·0	15−1·5	16−0·7	11·5	−·1	+·3	...
Oct. 18	2755	132	8−1·0	10−2·0	15−2·0	16−1·3	34−0·2	12·0	−·1	+·2	...
Oct. 31	2768	132	8−1·5	10−3·0	34−1·0	35−1·5	...	12·8	−·1	+·1	...
Nov. 7	2775	132	8−1·5	10−3·0	34−1·0	35−1·5	...	12·8	−·1	+·1	...
Nov. 12	2780	132	8−2·0	10−3·0	34−1·0	35−2·0	...	13·0	−·1	+·1	...
Nov. 26	2794	132	8−2·0	10−3·0	...	...	...	13·0	−·1	+·2	...
1894 Mar. 2	2890	...	1+0·7	3−1·3	12+1·2	17+1·0	18+0·6	8·3	+·1	−·3	...
Mar. 11	2899	...	1+1·0	3−1·0	12+1·5	17+1·2	18+0·8	8·0	+·1	−·3	...
Mar. 21	2909	...	1+1·2	3−1·0	12+1·5	17+1·0	18+0·3	8·1	+·1	−·3	...
Apr. 1	2920	..	1+1·3	3−0·7	12+1·7	17+1·3	18+0·7	7·8	+·1	−·3	...
Apr. 19	2938	...	1+1·6	3−1·0	17+1·2	18+1·0	..	7·8	+·1	−·2	...
Apr. 28	2947	...	1+1·3	3−1·0	15+2·0	17+1·0	18+0·5	8·0	+·1	−·1	...

S Coronæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1894 May 9	2958	...	1+1·4	3−0·7	12+1·4	17+1·3	18+1·0	7·8	+·1	−·3	...
May 20	2969	...	1+1·2	3+1·2	10+2·5	17+1·2	18+1·2	7·3	+·2	−·2	...
June 9	2989	...	1+1·0	3−1·3	10+2·0	17+0·7	18−0·3	8·4	0	−·2	...
June 20	3000	...	1+1·0	3−1·0	12+1·0	=17	18−1·0	8·7	0	−·3	...
July 4	3014	...	3−1·5	10+1·2	15+1·5	16+2·0	17−0·5	8·9	0	0	...
July 19	3029	...	1−0·3	8+2·0	10+1·0	17−1·0	18−1·5	9·5	0	0	...
Aug. 20	3061	...	8+0·7	10−0·3	15+0·5	16+1·0	17−1·3	10·0	0	+·1	...
Sept. 1	3073	...	8+0·4	10−0·6	15−1·0	16+0·4	34+1·0	10·7	0	+·2	...
Sept. 8	3080	...	=6	8+0·5	10−1·0	15−0·5	=16	10·6	0	+·3	...
Oct. 2	3104	80	8−0·3	10−1·5	15−1·3	16−0·5	35−0·3	11·3	−·1	+·2	...
Oct. 25	3127	132	8−0·5	10−2·5	15−1·3	16−0·5	...	11·6	−·1	+·3	...
Nov. 3	3136	80	8−1·0	10−2·0	15−2·0	16−1·0	...	11·9	−·1	+·3	...
Nov. 15	3148	132	8−2·0	10−3·0	...	...	...	13·0	−·1	+·2	...
1895 Mar. 1	3254	...	1−0·3	=4	10+2·0	17−0·5	18−1·0	9·1	−·1	−·1	...
Mar. 18	3271	...	3−2·0	4+1·5	12+1·5	17+0·5	18−1·0	8·6	0	−·3	...
Mar. 25	3278	...	1+1·0	3−1·3	4+1·0	17+0·5	18−0·3	8·3	0	−·2	...
Apr. 7	3291	...	1+1·0	3−1·3	12+1·0	17+1·0	18−0·3	8·4	0	−·3	...
Apr. 13	3297	...	1+0·4	3−1·5	12+1·0	17+0·2	18−0·7	8·8	0	−·3	...
May 4	3318	...	1+0·5	8+2·0	10+1·5	17+0·5	18−0·3	8·7	+·1	0	...
May 22	3336	...	1−0·4	10+2·0	12+1·0	17−0·4	18−1·0	9·2	0	−·2	...
June 5	3350	...	8+2·3	10+1·5	16+2·5	17−0·5	18−1·0	8·8	0	0	...
July 4	3379	...	8+2·0	10+1·3	15+1·3	17−1·0	18−1·0	9·2	0	0	...
Aug. 3	3409	...	1−1·3	8+1·0	10−1·0	15−0·5	16+1·0	10·3	0	+·3	...
Aug. 15	3421	...	=2	8+0·3	10−1·0	15−1·0	16+0·3	10·8	0	+·3	...
Aug. 30	3436	...	=8	10−1·5	15−1·0	=16	...	11·0	0	+·3	...
Sept. 13	3450	...	=2	8−0·1	10−1·5	15−1·0	16−0·1	11·0	−·1	+·3	...
Sept. 25	3462	80	2−1·0	8−1·0	10−2·0	15−2·3	16−1·3	12·0	−·1	+·3	...
Oct. 16	3483	132	8−1·5	10−3·0	...	..	...	12·7	−·1	+·2	...
Nov. 9	3507	132	8−1·5	10−2·5	...	...	...	12·5	−·1	+·2	...
1896 Feb. 22	3612	...	=1	3−1·5	4+0·6	17−0·5	18−1·0	9·1	−·1	−·2	...
Mar. 1	3620	...	1+1·0	3−1·3	4+1·3	17+0·8	18−0·2	8·3	0	−·2	...
Mar. 14	3633	...	1+1·0	3−1·3	4+1·5	17+1·3	18+1·0	7·8	+·1	−·2	...
Mar. 19	3638	...	3−1·0	4+1·6	17+1·3	18+0·8	...	7·8	+·1	−·3	...
Mar. 27	3646	...	1+1·3	3−0·6	4+2·0	17+1·6	18+1·3	7·5	+·1	−·2	...
Apr. 8	3658	...	1+1·4	3−0·2	4+1·4	17+1·0	18+1·0	7·7	+·1	−·2	...
Apr. 17	3667	...	1+1·3	3−1·0	10+2·0	17+1·3	18+1·0	7·9	+·1	−·2	...
Apr. 26	3676	...	3−1·3	10+1·5	15+1·5	17+0·8	18−0·5	8·5	0	−·2	...
May 6	3686	...	1+0·5	3−1·3	15+2·0	17+0·5	18+0·3	8·4	+·1	−·1	...
May 14	3694	...	1+0·5	8+2·0	10+1·5	17+0·3	18−0·7	8·8	+·1	0	...
May 26	3706	...	1+0·7	3−1·3	8+1·7	17+0·5	=18	8·7	+·1	−·1	...
June 11	3722	...	1+1·0	3−1·4	10+2·0	17−0·2	18−0·8	8·7	0	−·2	...
June 21	3732	...	=1	3−1·3	10+1·2	17−0·6	18−0·8	9·1	−·1	−·2	...
July 18	3759	...	1−0·6	8+2·0	10+1·0	17−1·0	18−2·0	9·6	0	0	...
Aug. 3	3775	...	1−1·3	8+1·3	10+0·7	15+0·3	16+1·2	9·7	+·1	+·3	...
Aug. 13	3785	...	8+1·0	10+0·2	=15	16+1·0	34+1·8	9·9	+·2	+·1	...
Sept. 2	3805	...	8+0·7	10−0·3	15−1·0	16+0·5	17−1·7	10·5	0	+·1	...

S Coronæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1896 Sept. 18	3821	...	8+0·3	10−1·0	15−1·0	=16	...	10·8	0	+·3	...
Sept. 28	3831	...	8−0·5	10−1·2	15−1·0	16−0·5	...	11·2	−·1	+·3	...
Oct. 9	3842	...	8−0·3	10−1·3	15−1·0	16−0·3	=35	11·1	−·1	+·2	...
Oct. 27	3860	...	8−1·0	10−2·0	15−2·0	16−1·0	=34	11·8	−·1	+·2	...
Nov. 9	3873	80	8−1·0	10−2·3	15−1·5	16−1·0	34−1·0	12·0	−·1	+·2	...
1897 Mar. 3	3987	...	=1	3−2·0	12+1·5	17+0·3	18−0·7	8·9	0	−·3	...
Mar. 10	3994	...	1+1·0	3−1·0	12+1·3	17+1·0	=18	8·2	+·1	−·3	...
Mar. 13	3997	...	1+1·2	3−1·0	12+1·4	17+1·2	18+1·0	7·9	+·1	−·3	...
Mar. 22	4006	...	1+1·3	3−1·0	12+1·6	17+1·6	18+1·0	7·8	+·1	−·3	...
Mar. 28	4012	...	1+1·5	3−0·2	12+1·8	17+1·5	18+1·3	7·5	+·1	−·3	...
Apr. 7	4022	...	1+1·5	3−0·3	12+1·5	17+1·3	18+1·0	7·7	+·1	−·3	...
Apr. 22	4037	...	1+1·0	3−0·6	12+1·5	17+1·0	18+1·0	7·9	+·1	−·3	...
May 11	4056	...	1+1·3	3−1·0	10+2·3	17+1·0	18+0·8	7·9	+·1	−·2	...
May 21	4066	...	1+1·0	3−1·0	10+2·3	17+0·7	18+0·7	8·1	+·1	−·2	...
June 2	4078	...	1+1·0	3−1·2	10+2·3	17+0·7	=18	8·2	+·1	−·2	...
June 11	4087	...	1+0·3	4+1·0	10+1·5	=17	18−0·5	8·6	+·1	−·1	...
July 11	4117	...	=1	3−1·4	10+1·0	17−1·0	18−1·0	9·3	−·1	−·2	...
July 24	4130	...	1−1·0	8+2·0	10+1·0	17+1·2	18+1·8	8·5	+·1	0	...
Aug. 12	4149	...	8+2·0	10+1·0	15+0·6	16+1·5	17−1·5	9·4	+·1	+·1	...
Sept. 12	4180	...	1−2·0	8+0·7	10−0·3	=15	16+1·0	10·2	0	+·3	...
Oct. 1	4199	...	=8	10−1·3	15−1·0	=16	34−0·3	11·2	−·1	+·2	...
Oct. 26	4224	80	1−3·0	8−1·0	10−2·0	15−2·0	16−1·0	11·9	−·2	+·3	...
Nov. 29	4258	80	8−1·0	10−2·3	15−2·0	16−1·0	...	12·0	−·2	+·3	...
1898 Mar. 11	4360	...	1+2·5	3+0·6	4+3·0	17+1·5	18+1·5	6·8	+·3	−·2	...
Mar. 20	4369	...	1+3·0	3+1·0	12+3·0	17+3·0	18−2·0	7·1	+·2	−·3	...
Mar. 29	4378	...	1+2·0	3+0·7	12+3·0	17+3·0	18+2·0	6·6	+·3	−·3	...
Apr. 5	4385	...	1+2·0	3+1·0	12+2·3	17+2·0	18+1·5	6·9	+·3	−·3	...
Apr. 23	4403	...	1+1·5	3+0·5	17+2·0	18+1·5	...	7·1	+·3	−·2	...
May 6	4416	...	1+1·5	3−1·0	4+1·7	17+1·3	18+1·0	7·7	+·2	−·2	...
May 26	4436	...	1+1·0	3−1·3	10+2·3	17+0·2	18−0·6	8·5	+·1	−·2	...
June 7	4448	...	1+1·0	3−1·3	17+0·3	=18	...	8·5	+·1	−·2	...
June 17	4458	...	1+0·6	3−1·5	10+1·5	=17	18−0·6	8·8	0	−·2	...
June 26	4467	...	1−0·5	8+2·0	10+1·0	17−0·2	18−1·0	9·2	−·1	0	...
July 5	4476	...	=1	15+1·0	16+2·0	17−1·0	18−1·0	9·1	0	0	...
July 14	4485	...	1−0·3	10+1·3	15+1·3	16+2·0	17−1·2	9·1	+·1	+·1	...
July 28	4499	...	1−1·0	10+1·0	15+0·8	16+1·5	17−1·3	9·5	+·1	+·1	...
Aug. 16	4518	...	8+2·0	10+0·7	15+0·7	16+1·0	17−1·3	9·5	+·2	+·1	...
Aug. 24	4526	...	8+1·3	10+0·5	=15	16+1·3	17−2·0	9·9	+·1	+·1	...
Sept. 12	4545	80	1−2·0	8+0·2	10−1·3	15−1·0	=16	10·9	−·1	+·3	...
Sept. 20	4553	...	8+0·5	10−1·5	15−0·5	=16	17−2·0	10·8	−·1	+·2	...
Oct. 12	4575	132	1−3·0	8−1·0	10−2·3	15−2·5	16−1·0	12·1	−·2	+·3	...
Oct. 30	4593	132	8−1·3	10−2·5	15−2·5	16−1·0	...	12·2	−·2	+·3	...
Nov. 9	4603	132	8−1·0	10−2·3	15−2·0	16−1·0	...	12·0	−·2	+·3	...
1899 Mar. 4	4718	...	1+2·0	3−1·5	4+2·0	17+1·5	18+1·0	7·6	+·2	−·2	...
Mar. 9	4723	...	1+2·0	3−2·0	12+2·0	17+2·0	18+1·0	7·7	+·2	−·3	...
Mar. 17	4731	...	1+2·0	3−2·0	10+3·0	17+1·7	18+1·0	7·7	+·2	−·2	...

S CORONÆ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1899 Mar. 24	4738	...	1+1·0	3−1·5	12+1·5	17+1·0	18+0·3	8·2	+·2	−·3	...
Apr. 7	4752	...	1+2·0	3−1·6	12+1·5	17+1·5	18+1·0	7·8	+·2	−·3	...
Apr. 15	4760	...	1+1·0	3−1·3	12+1·3	17+1·0	=18	8·3	+·1	−·3	...
May 2	4777	...	1+1·3	3−2·0	12+1·5	17+1·3	=18	8·3	+·1	−·3	...
May 28	4803	...	1+0·5	3−2·0	10+2·0	17−0·7	18−1·3	9·1	−·1	−·2	...
June 6	4812	...	1−0·2	8+2·5	10+1·7	17−0·7	18−1·5	9·1	−·1	0	...
June 16	4822	...	8+2·5	10+2·0	15+2·0	17−1·3	18−2·0	8·9	+·1	0	...
July 4	4848	...	1−1·3	8+2·0	10+1·3	15+0·5	17−2·0	9·8	+·1	+·1	...
July 29	4865	...	1−1·5	8+1·3	=10	=15	16+1·0	9·9	+·1	+·3	...
Aug. 8	4875	...	1−2·3	=8	10−1·3	15−1·3	=16	11·1	−·1	+·3	...
Aug. 18	4885	...	=6	8+0·8	10−1·2	15−1·0	16+0·5	10·6	0	+·3	...
Aug. 23	4890	...	=6	8+0·8	10−1·2	15−0·5	16+0·7	10·4	0	+·3	...
Sept. 3	4901	...	4−2·0	8+0·3	10−1·7	15−1·0	16−0·5	11·1	−·1	+·2	...
Sept. 26	4924	80	2−1·0	8−1·0	10−2·0	15−1·5	16−1·0	11·8	−·2	+·3	...
Oct. 2	4930	80	2−0·5	8−1·0	10−2·0	15−2·0	16−1·0	11·8	−·2	+·3	...
Oct. 9	4937	80	2−1·0	8−1·0	10−2·0	15−1·7	16−1·0	11·8	−·2	+·3	...
Nov. 6	4965	132	2−1·0	6−1·5	8−1·5	10−3·0	16−1·0	12·2	−·2	+·3	...
											G.M.T. h m
1900 Mar. 12	5091	...	1+2·5	3−0·7	12+2·5	17+2·0	18+1·5	7·1	+·2	−·3	9 30
Mar. 17	5096	...	1+2·5	3−0·5	4+2·5	17+2·0	18+1·5	7·0	+·2	−·2	9 30
Mar. 26	5105	...	1+1·5	3−1·5	12+2·0	17+2·0	18+1·3	7·6	+·2	−·3	9 30
Mar. 29	5108	...	1+2·0	3−1·0	12+2·0	17+2·0	18+1·7	7·4	+·2	−·3	9 30
Apr. 9	5119	...	1+2·0	3−1·2	10+3·0	17+1·3	18+1·0	7·6	+·2	−·2	8 40
Apr. 15	5125	...	1+1·7	3−1·0	12+2·0	17+1·5	18+1·3	7·6	+·2	−·3	9 10
Apr. 26	5136	...	1+1·8	3−1·5	12+2·0	17+1·5	18+1·0	7·7	+·2	−·3	9 40
May 3	5143	...	1+2·3	3−1·3	12+2·5	17+2·0	18+1·3	7·3	+·2	−·3	9 50
May 22	5162	...	1+1·5	3−2·0	12+1·5	17+1·0	18+0·7	8·2	+·2	−·3	9 50
June 9	5180	...	1+0·6	3−2·0	10+2·0	17−0·6	18−1·2	9·0	−·1	−·2	9 20
June 26	5197	...	1+0·6	4+1·0	10+1·3	15+1·5	17−1·5	8·8	+·2	+·1	10 10
July 14	5215	...	1−0·5	8+2·2	10+1·0	15+1·3	16+1·8	8·9	+·2	+·3	11 0
July 25	5226	...	1−1·5	8+1·8	10+1·3	15+1·0	16+2·0	9·2	+·2	+·3	9 50
Aug. 14	5246	...	4−1·7	8+1·0	=10	=15	16+1·0	10·0	0	+·2	10 0
Aug. 31	5263	...	=8	10−1·0	15−1·0	=16	...	10·9	−·1	+·3	9 50
Sept. 11	5274	132	=8	10−1·0	15−1·0	=16	...	10·9	−·1	+·3	10 0
Sept. 19	5282	...	=2	8+0·7	10−1·3	15−1·0	=16	10·8	0	+·2	8 0
Oct. 10	5303	132	8−1·0	10−2·0	15−2·2	16−1·0	34−1·0	12·1	−·2	+·2	7 30
Oct. 19	5312	80	2−0·5	8−1·0	10−2·2	15−2·0	16−1·0	11·8	−·2	+·3	7 50
Nov. 13	5337	132	8−1·0	10−2·0	15−1·5	16−1·0	...	11·8	−·2	+·3	7 10

R URSÆ MINORIS.

R. A. $16^h\ 31^m\ 18^s$. Dec. $+72°\ 28'{\cdot}7$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1891 Nov. 3	2040	...	$a-1{\cdot}0$	$c-0{\cdot}5$	$d-0{\cdot}6$	$e-0{\cdot}2$	$f+1{\cdot}0$	9·5	−·2	0	...
Nov. 24	2061	...	$a-1{\cdot}5$	$d-1{\cdot}2$	$e-0{\cdot}2$	$f+1{\cdot}0$	...	9·7	−·1	0	...
Dec. 17	2084	...	$a-1{\cdot}0$	$b-1{\cdot}5$	$d-1{\cdot}0$	$e-0{\cdot}3$	$f+0{\cdot}5$	9·8	−·2	−·1	...
Dec. 23	2090	...	$d-1{\cdot}4$	$e-0{\cdot}2$	$f-0{\cdot}4$	$k+1{\cdot}5$	$l+1{\cdot}5$	10·1	0	−·1	...
1892 Jan. 27	2125	...	$a-1{\cdot}4$	$d-0{\cdot}4$	$e+0{\cdot}3$	$f+0{\cdot}6$	$k+1{\cdot}5$	9·5	+·1	0	...
Feb. 18	2147	...	$a-1{\cdot}6$	$d-1{\cdot}3$	$=e$	$=f$	...	10·0	0	0	...
Mar. 14	2172	...	$a-1{\cdot}3$	$d-0{\cdot}2$	$e+0{\cdot}3$	$f+1{\cdot}2$	$g+1{\cdot}0$	9·3	+·1	−·1	...
Mar. 28	2186	...	$a-1{\cdot}5$	$c-1{\cdot}0$	$d-0{\cdot}5$	$=e$	$f+1{\cdot}0$	9·6	−·1	0	...
Apr. 5	2194	...	$a-1{\cdot}5$	$b-1{\cdot}0$	$d-0{\cdot}5$	$=e$	$=f$	9·7	−·2	−·1	...
Apr. 27	2216	...	$a-1{\cdot}5$	$=d$	$=e$	$=f$	$g+1{\cdot}0$	9·6	0	−·1	...
May 20	2239	...	$a-1{\cdot}5$	$=d$	$e+1{\cdot}0$	$f+1{\cdot}0$	$g+1{\cdot}5$	9·1	+·1	−·1	...
June 3	2253	...	$a-1{\cdot}3$	$=d$	$e+0{\cdot}3$	$f+0{\cdot}5$	$g+1{\cdot}2$	9·4	+·1	−·1	...
June 15	2265	...	$a-1{\cdot}0$	$c-0{\cdot}5$	$d-0{\cdot}5$	$e+1{\cdot}0$	$g+1{\cdot}0$	9·3	−·1	0	...
July 4	2284	...	$a-1{\cdot}5$	$=c$	$=d$	$e+0{\cdot}2$	$g+1{\cdot}0$	9·4	+·1	0	...
July 23	2303	...	$a-1{\cdot}2$	$=c$	$=d$	$e+0{\cdot}5$	$f+0{\cdot}5$	9·3	+·1	0	...
Aug. 16	2327	...	$a-1{\cdot}5$	$d-1{\cdot}5$	$e-0{\cdot}5$	$=f$	$g-0{\cdot}5$	10·3	−·2	−·1	...
Aug. 25	2336	...	$a-1{\cdot}5$	$c-0{\cdot}6$	$d-1{\cdot}0$	$=f$	$=g$	9·9	−·2	−·1	...
Sept. 7	2349	...	$b-1{\cdot}5$	$d-0{\cdot}5$	$=g$	$k+1{\cdot}2$	$k+1{\cdot}2$	9·9	0	−·1	...
Sept. 24	2366	...	$a-1{\cdot}0$	$=d$	$e+1{\cdot}0$	$f+0{\cdot}5$	$=g$	9·4	+·1	0	...
Oct. 8	2380	...	$d-1{\cdot}0$	$f+0{\cdot}3$	$g+0{\cdot}6$	$k+1{\cdot}3$	$k+1{\cdot}3$	9·8	+·2	−·1	...
Oct. 15	2387	...	$a-1{\cdot}3$	$c-0{\cdot}5$	$d-0{\cdot}7$	$f+0{\cdot}3$	$g+0{\cdot}3$	9·7	−·1	−·1	...
Oct. 23	2395	...	$a-1{\cdot}0$	$b-0{\cdot}5$	$=c$	$d-0{\cdot}5$	$=f$	9·4	−·2	0	...
Nov. 7	2410	...	$a-1{\cdot}3$	$b-1{\cdot}0$	$=d$	$f+0{\cdot}7$	$g+1{\cdot}3$	9·3	0	−·1	...
Nov. 29	2432	...	$a-1{\cdot}3$	$c-0{\cdot}3$	$d-0{\cdot}5$	$f+0{\cdot}5$	$g+0{\cdot}5$	9·5	−·1	−·1	...
Dec. 9	2442	...	$a-1{\cdot}2$	$c-1{\cdot}0$	$d-0{\cdot}5$	$f+1{\cdot}0$	...	9·5	−·1	0	...
Dec. 25	2458	...	$a-1{\cdot}0$	$c-0{\cdot}5$	$=d$	$f+1{\cdot}0$	$g+1{\cdot}0$	9·2	0	−·1	...
1893 Jan. 11	2475	...	$a-1{\cdot}3$	$c-0{\cdot}6$	$d-0{\cdot}3$	$e+1{\cdot}5$	$f+0{\cdot}6$	9·2	0	0	...
Jan. 27	2491	...	$a-1{\cdot}3$	$d-0{\cdot}3$	$e+2{\cdot}0$	$f+1{\cdot}0$	$g+1{\cdot}0$	9·0	0	−·1	...
Feb. 8	2503	...	$a-1{\cdot}0$	$c-0{\cdot}5$	$d-0{\cdot}5$	$f+1{\cdot}0$	$g+1{\cdot}0$	9·3	0	−·1	...
Mar. 4	2527	...	$a-1{\cdot}3$	$b-1{\cdot}0$	$d+0{\cdot}3$	$f+0{\cdot}5$	$g+1{\cdot}0$	9·4	0	−·1	...
Mar. 10	2533	...	$a-1{\cdot}0$	$b-1{\cdot}0$	$d+0{\cdot}2$	$f+1{\cdot}0$	$g+1{\cdot}0$	9·3	0	−·1	...
Mar. 19	2542	...	$a-1{\cdot}0$	$c-0{\cdot}5$	$d+0{\cdot}5$	$f+1{\cdot}0$	$g+1{\cdot}0$	9·1	0	−·1	...
Mar. 30	2553	...	$a-1{\cdot}2$	$c-0{\cdot}6$	$d+0{\cdot}2$	$f+1{\cdot}0$	$g+1{\cdot}0$	9·2	0	−·1	...
Apr. 14	2568	...	$a-1{\cdot}3$	$b-1{\cdot}0$	$d+0{\cdot}2$	$f+0{\cdot}5$	$g+1{\cdot}0$	9·4	0	−·1	...
May 5	2589	...	$a-1{\cdot}3$	$d-0{\cdot}7$	$e+1{\cdot}5$	$f+0{\cdot}3$	$g+0{\cdot}6$	9·4	0	−·1	...
May 25	2609	...	$a-1{\cdot}3$	$b-1{\cdot}3$	$d-0{\cdot}3$	$f+0{\cdot}5$	$g+1{\cdot}0$	9·6	0	−·1	...
June 2	2617	...	$a-1{\cdot}3$	$=c$	$d+0{\cdot}2$	$e+1{\cdot}3$	$f+0{\cdot}6$	9·0	+·1	0	...
June 30	2645	...	$a-1{\cdot}5$	$d-0{\cdot}3$	$e+1{\cdot}5$	$f+0{\cdot}4$	$g+1{\cdot}0$	9·3	0	−·1	...
July 22	2667	...	$a-1{\cdot}5$	$b-1{\cdot}0$	$d-1{\cdot}0$	$f+0{\cdot}5$	$g+0{\cdot}5$	9·8	0	−·1	...
Aug 14	2690	...	$a-1{\cdot}5$	$c-0{\cdot}5$	$d-0{\cdot}5$	$=f$	$k+1{\cdot}3$	9·6	−·1	−·1	...
Aug. 24	2700	...	$d-1{\cdot}0$	$f+0{\cdot}5$	$g+1{\cdot}0$	$k+1{\cdot}5$	$k+1{\cdot}5$	9·6	+·1	−·1	...
Sept. 7	2714	...	$d-1{\cdot}0$	$f+0{\cdot}3$	$g+0{\cdot}7$	$k+1{\cdot}2$	$k+1{\cdot}2$	9·8	+·1	−·1	...

R Ursæ Minoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1893 Sept. 23	2730	...	$a-1.3$	$b-1.0$	$c-0.5$	$d-0.5$	$f+0.5$	9.7	−.1	0	...
Oct. 7	2744	...	$a-1.0$	$c-0.3$	$d-0.7$	$f+1.0$	$g+0.5$	9.4	0	−.1	...
Oct. 19	2756	...	$a-1.0$	$=c$	$d-0.5$	$f+1.0$	$g+1.0$	9.2	0	−.1	...
Nov. 5	2773	...	$a-1.3$	$b-1.0$	$c-0.3$	$d+0.2$	$f+1.0$	9.3	0	0	...
Dec. 2	2800	...	$a-1.0$	$b-1.0$	$d-0.5$	$f+1.0$	$g+1.0$	9.4	0	−.1	...
Dec. 16	2814	...	$a-1.0$	$b-1.0$	$c-1.0$	$d-0.5$	$f+1.0$	9.5	−.1	0	...
1894 Jan. 23	2852	...	$a-1.0$	$b-0.5$	$d-0.3$	$f+1.0$	$g+1.0$	9.3	0	−.1	...
Feb. 8	2868	...	$a-1.3$	$c-0.6$	$d-0.5$	$f+0.5$	$g+1.0$	9.5	0	−.1	...
Feb. 21	2881	...	$a-1.0$	$b-0.5$	$=d$	$f+0.5$	$g+1.0$	9.3	0	−.1	...
Mar. 4	2892	...	$a-1.0$	$b-1.0$	$c-0.5$	$=d$	$f+0.5$	9.4	−.1	0	...
Mar. 15	2903	...	$a-1.3$	$b-1.0$	$d-0.2$	$f+1.0$	$g+1.2$	9.4	0	−.1	...
Mar. 25	2913	...	$a-1.3$	$b-1.0$	$c-0.5$	$=d$	$f+0.7$	9.4	−.1	0	...
Apr. 22	2941	...	$a-1.0$	$b-1.0$	$c-0.5$	$d+0.2$	$f+0.5$	9.4	0	0	...
May 1	2950	...	$a-1.5$	$b-1.2$	$c-0.3$	$d-0.3$	$=f$	9.7	−.2	0	...
May 18	2967	...	$a-1.5$	$c-0.7$	$d-0.5$	$f+0.5$	$g+0.5$	9.6	0	−.1	...
June 13	2993	...	$a-1.5$	$b-1.4$	$c-1.2$	$d-1.0$	$f+0.5$	9.9	−.1	0	...
June 28	3008	...	$a-1.3$	$d-0.5$	$f-0.2$	$k+1.0$	$l+1.0$	10.0	0	−.1	...
July 18	3028	...	$c-0.5$	$d-1.0$	$e+1.3$	$g+0.5$	...	9.4	0	0	...
Aug. 26	3067	...	$a-1.2$	$b-1.0$	$c-0.3$	$d-0.3$	$f+1.0$	9.4	−.1	0	...
Sept. 8	3080	...	$a-1.0$	$b-0.7$	$d+0.3$	$f+0.7$	$g+1.0$	9.2	0	−.1	...
Sept. 29	3101	...	$a-1.2$	$b-0.6$	$c-0.3$	$d-0.3$	$f+0.3$	9.4	−.1	0	...
Oct. 22	3124	...	$a-1.3$	$=c$	$d-0.3$	$f+1.0$	$g+1.0$	9.2	0	−.1	...
Nov. 5	3138	...	$a-1.2$	$b-1.0$	$d-0.3$	$e+2.0$	$f+1.0$	9.0	0	−.1	...
Nov. 23	3156	...	$a-1.0$	$b-0.8$	$=d$	$f+1.3$	...	9.0	0	−.1	...
Dec. 8	3171	...	$a-1.2$	$b-1.2$	$c-0.3$	$=d$	$f+0.7$	9.4	−.1	0	...
Dec. 20	3183	...	$a-1.3$	$b-1.0$	$=d$	$f+0.7$	$g+1.0$	9.4	0	−.1	...
1895 Jan. 18	3212	...	$a-1.3$	$b-1.0$	$c-0.6$	$d-0.3$	$f+0.7$	9.5	−.1	0	...
Feb. 11	3236	...	$a-1.3$	$c-0.7$	$d-0.5$	$f+0.3$	$g+1.0$	9.5	0	−.1	...
Feb. 17	3242	...	$a-1.0$	$c-0.5$	$f+0.6$	$h+1.5$	$k+2.0$	9.3	0	−.1	...
Mar. 17	3270	...	$a-1.3$	$d-0.2$	$f+0.7$	$h+1.3$	$k+1.3$	9.4	0	−.1	...
Mar. 28	3281	...	$a-1.5$	$b-1.0$	$c+1.5$	$=d$	$f+0.5$	9.1	0	0	...
Apr. 12	3296	...	$a-1.4$	$b-1.0$	$d+0.2$	$f+1.0$	$g+1.5$	9.2	0	−.1	...
May 4	3318	...	$a-1.3$	$b-1.0$	$c-0.5$	$d-0.3$	$f+0.3$	9.6	−.1	0	...
May 16	3330	...	$a-1.5$	$b-1.0$	$=d$	$=f$	$g+1.0$	9.6	0	−.1	...
June 2	3347	...	$a-1.2$	$b-1.0$	$d-0.2$	$f+0.5$	$g+1.0$	9.5	0	−.1	...
June 27	3372	...	$a-1.3$	$c-0.4$	$d-0.2$	$f+0.5$	$g+1.0$	9.4	0	−.1	...
July 12	3387	...	$a-1.0$	$b-0.3$	$d-1.0$	$e+2.0$	$f+1.0$	9.0	0	−.1	...
July 28	3403	...	$a-1.0$	$b-1.0$	$d+0.7$	$f+1.0$	...	9.1	0	−.1	...
Aug. 15	3421	...	$a-1.0$	$b-0.6$	$c-0.5$	$d+0.2$	$f+1.0$	9.2	0	0	...
Aug. 28	3434	...	$a-0.7$	$b-1.0$	$=d$	$f+1.0$	$k+1.3$	9.3	0	−.1	...
Sept. 13	3450	...	$a-1.0$	$b-0.5$	$d+0.3$	$f+0.5$	$k+1.3$	9.3	0	−.1	...
Sept. 25	3462	...	$a-1.2$	$b-0.7$	$d+0.3$	$f+1.0$	...	9.2	0	−.1	...
Oct. 16	3483	...	$a-1.0$	$b-1.0$	$c+0.5$	$d+0.5$	$f+1.0$	9.0	0	0	...
Oct. 27	3494	...	$a-1.0$	$b-1.0$	$d-0.2$	$f+1.0$	$h+1.5$	9.2	0	−.1	...
Nov. 9	3507	...	$a-1.3$	$b-1.0$	$c-0.3$	$=d$	$f+1.0$	9.3	−.1	0	...
Nov. 30	3528	...	$a-1.3$	$b-1.0$	$c-0.3$	$d-0.6$	$f+0.5$	9.6	−.1	0	...

R Ursæ Minoris—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1895 Dec. 16	3544	...	$a-1\cdot0$	$b-1\cdot0$	$c-0\cdot5$	$d+0\cdot3$	$f+0\cdot8$	9·3	0	0	...
1896 Jan. 15	3574	...	$a-1\cdot5$	$b-1\cdot3$	$c-0\cdot5$	$d-0\cdot3$	$f+0\cdot3$	9·7	−·1	0	...
Jan. 28	3587	...	$a-1\cdot3$	$d-0\cdot7$	$f+0\cdot6$	$k+1\cdot3$	$k+1\cdot3$	9·6	0	−·1	...
Feb. 20	3610	...	$a-1\cdot0$	$b-1\cdot0$	$d-0\cdot3$	$=f$	$g+1\cdot0$	9·6	−·1	−·1	...
Mar. 16	3635	...	$a-1\cdot5$	$d-1\cdot0$	$=f$	$k+1\cdot0$	$k+1\cdot0$	9·9	0	−·1	...
Apr. 5	3655	...	$a-1\cdot5$	$=d$	$f-0\cdot3$	$k+0\cdot8$	$k+0\cdot8$	9·8	0	−·1	...
Apr. 19	3669	...	$a-1\cdot3$	$b-1\cdot0$	$d-0\cdot5$	$=f$	$k+1\cdot0$	9·7	−·1	−·1	...
May 3	3683	...	$a-1\cdot4$	$b-1\cdot0$	$c-0\cdot2$	$d-0\cdot2$	$f+0\cdot4$	9·5	−·1	0	...
May 20	3700	...	$a-1\cdot3$	$b-1\cdot0$	$c-0\cdot3$	$d-0\cdot3$	$f+0\cdot7$	9·4	−·1	0	...
June 19	3730	...	$a-1\cdot2$	$b-0\cdot3$	$=c$	$d+0\cdot4$	$f+0\cdot7$	9·1	0	0	...
July 30	3771	...	$a-1\cdot3$	$b-0\cdot2$	$c+0\cdot2$	$=d$	$f+0\cdot7$	9·1	0	0	...
Aug. 12	3784	...	$a-1\cdot0$	$b-0\cdot8$	$c-0\cdot1$	$=d$	$f+1\cdot0$	9·2	−·1	0	...
Aug. 26	3798	...	$a-1\cdot3$	$b-1\cdot0$	$c-0\cdot5$	$d-0\cdot5$	$f+0\cdot7$	9·5	−·1	0	...
Sept. 15	3818	...	$a-1\cdot3$	$b-1\cdot0$	$c-0\cdot5$	$d-0\cdot3$	$f+0\cdot5$	9·4	−·1	0	...
Sept. 26	3829	...	$b-1\cdot3$	$d-0\cdot3$	$f+0\cdot5$	$g-1\cdot2$	$k+1\cdot0$	10·0	0	−·1	...
Oct. 18	3851	...	$a-1\cdot3$	$b-0\cdot7$	$c-0\cdot3$	$d-0\cdot3$	$f+0\cdot5$	9·4	−·1	0	...
Oct. 31	3864	...	$a-1\cdot5$	$b-1\cdot3$	$c-1\cdot0$	$d-1\cdot0$	$f+0\cdot2$	9·9	−·1	0	...
Nov. 6	3870	...	$a-1\cdot0$	$b-1\cdot0$	$=c$	$d-0\cdot5$	$f+0\cdot7$	9·4	−·1	0	...
Nov. 20	3884	...	$a-1\cdot3$	$b-1\cdot0$	$d-0\cdot6$	$f+0\cdot4$	$k+1\cdot5$	9·5	0	−·1	...
Dec. 17	3911	...	$a-1\cdot0$	$b-0\cdot7$	$c-0\cdot5$	$=d$	$f+1\cdot0$	9·2	−·1	0	...
1897 Jan. 17	3942	...	$a-1\cdot0$	$b-0\cdot6$	$=c$	$d-0\cdot2$	$f+1\cdot0$	9·2	−·1	0	...
Feb. 17	3973	...	$a-1\cdot3$	$b-1\cdot0$	$c-0\cdot7$	$d-0\cdot7$	$=f$	9·7	−·2	0	...
Mar. 15	3999	...	$a-1\cdot3$	$c-0\cdot7$	$d-0\cdot3$	$=f$	$k+1\cdot0$	9·7	−·1	−·1	...
Apr. 22	4037	...	$a-1\cdot3$	$b-0\cdot7$	$c-0\cdot3$	$=d$	$f+0\cdot3$	9·4	−·1	0	...
May 11	4056	...	$a-1\cdot4$	$b-1\cdot0$	$c-0\cdot5$	$d+0\cdot3$	$f+0\cdot7$	9·4	0	0	...
June 20	4096	...	$a-1\cdot3$	$=c$	$d+0\cdot2$	$f+0\cdot8$	$g+1\cdot0$	9·2	+·1	−·1	...
July 12	4118	...	$a-1\cdot3$	$b-0\cdot3$	$c+0\cdot2$	$d+0\cdot3$	$f+1\cdot2$	9·0	0	0	...
Aug. 16	4153	...	$a-1\cdot3$	$b-1\cdot3$	$c-0\cdot6$	$d-0\cdot3$	$f+0\cdot5$	9·6	−·1	0	...
Sept. 18	4186	...	$a-1\cdot3$	$b-1\cdot0$	$c+0\cdot2$	$d+0\cdot2$	$f+0\cdot7$	9·2	0	0	...
Oct. 20	4218	...	$a-1\cdot5$	$c-0\cdot5$	$d-0\cdot6$	$f+0\cdot7$	$k+1\cdot3$	9·5	0	0	...
Nov. 19	4248	...	$a-2\cdot0$	$b-1\cdot5$	$c-1\cdot0$	$d-1\cdot0$	$f-0\cdot5$	10·2	−·1	0	...
Dec. 20	4279	...	$a-2\cdot0$	$c-1\cdot0$	$d-1\cdot2$	$f+0\cdot3$	$k+2\cdot0$	9·9	0	−·1	...
1898 Feb. 2	4323	...	$a-1\cdot7$	$b-1\cdot3$	$c-0\cdot7$	$d-1\cdot0$	$f+0\cdot3$	9·9	−·2	0	...
Mar. 2	4351	...	$a-1\cdot5$	$c-1\cdot0$	$d-0\cdot5$	$=f$	$g+1\cdot0$	9·7	−·1	−·1	...
Mar. 22	4371	...	$a-2\cdot0$	$b-1\cdot0$	$c-0\cdot5$	$=d$	$=f$	9·7	−·2	0	...
Apr. 12	4392	...	$a-1\cdot3$	$b-1\cdot2$	$c-0\cdot3$	$d+0\cdot5$	$f+0\cdot7$	9·3	−·1	0	...
Apr. 29	4409	...	$a-2\cdot0$	$b-1\cdot5$	$c-1\cdot0$	$d-0\cdot5$	$f+0\cdot5$	9·9	−·2	0	...
May 26	4436	...	$a-1\cdot3$	$b-0\cdot6$	$=c$	$=d$	$f+1\cdot0$	9·2	−·1	0	...
June 17	4458	...	$a-1\cdot3$	$b-0\cdot3$	$c+0\cdot3$	$d+0\cdot7$	$f+1\cdot0$	8·9	+·1	0	...
July 11	4482	...	$a-1\cdot0$	$b-1\cdot0$	$c-0\cdot5$	$=d$	$f+1\cdot0$	9·3	−·1	0	...
Aug. 16	4518	...	$a-1\cdot3$	$b-1\cdot3$	$c-1\cdot0$	$=d$	$f+0\cdot5$	9·6	−·1	0	...
Sept. 16	4549	...	$a-1\cdot5$	$b-1\cdot3$	$c-1\cdot0$	$d-1\cdot0$	$f+0\cdot2$	9·9	−·2	0	...
Oct. 1	4564	...	$a-1\cdot5$	$c-1\cdot0$	$d-1\cdot0$	$f+0\cdot2$	$k+1\cdot0$	10·0	−·1	−·1	...
Oct. 30	4593	...	$a-1\cdot5$	$b-1\cdot5$	$c-1\cdot0$	$d-1\cdot3$	$=f$	10·1	−·2	0	...
Nov. 22	4616	...	$a-1\cdot5$	$b-2\cdot0$	$c-1\cdot0$	$=f$	...	10·0	−·2	−·1	...
Dec. 9	4633	...	$a-2\cdot3$	$c-1\cdot0$	$d-1\cdot0$	$e+2\cdot0$	$f+0\cdot3$	9·6	−·1	0	...

R URSÆ MINORIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1898 Dec. 29	4653	...	$a-2\cdot0$	$c-1\cdot0$	$d-0\cdot3$	$f+1\cdot0$	$h+1\cdot7$	9·5	−·1	0	...
1899 Jan. 22	4677	...	$a-1\cdot5$	$b-1\cdot2$	$=c$	$=d$	$f+1\cdot0$	9·3	−·1	0	...
Feb. 2	4688	...	$a-2\cdot0$	$c-1\cdot0$	$d-0\cdot6$	$f+1\cdot6$	$h+1\cdot5$	9·5	−·1	0	...
Feb. 22	4708	...	$a-2\cdot0$	$c-1\cdot2$	$d-0\cdot7$	$f+1\cdot0$	$g+1\cdot0$	9·7	−·1	−·1	...
Mar. 20	4734	...	$a-2\cdot0$	$=c$	$d-1\cdot0$	$f+1\cdot0$	$g+1\cdot0$	9·5	0	−·1	...
Apr. 7	4752	...	$a-1\cdot5$	$b-1\cdot3$	$c-1\cdot0$	$=d$	$f+0\cdot7$	9·6	−·1	0	...
May 2	4777	...	$a-1\cdot5$	$b-0\cdot8$	$=c$	$d+1\cdot0$	$f+1\cdot5$	9·0	0	0	...
June 8	4814	...	$a-1\cdot5$	$b-1\cdot0$	$c+1\cdot0$	$d-0\cdot2$	$f+1\cdot0$	9·1	−·1	0	...
July 27	4863	...	$a-1\cdot7$	$c-0\cdot5$	$d-0\cdot5$	$f+0\cdot7$	$g+1\cdot2$	9·6	−·1	−·1	...
Aug. 23	4890	...	$a-2\cdot0$	$c-1\cdot7$	$d-1\cdot2$	$=f$	$g+1\cdot0$	10·1	−·1	−·1	...
Sept. 26	4924	...	$a-3\cdot0$	$c-1\cdot3$	$d-1\cdot5$	$=f$	$h+0\cdot7$	10·4	−·1	0	...
Oct. 17	4945	...	$a-2\cdot0$	$c-1\cdot0$	$d-1\cdot0$	$f+0\cdot7$	$h+1\cdot5$	9·8	−·1	0	...
Nov. 6	4965	...	$a-2\cdot0$	$c-1\cdot0$	$d-0\cdot3$	$f+1\cdot0$	$h+1\cdot3$	9·6	−·1	0	...
Nov. 17	4976	...	$a-2\cdot0$	$b-1\cdot3$	$c-1\cdot0$	$d-1\cdot0$	$f+1\cdot0$	9·9	−·2	0	...
Dec. 14	5003	...	$a-1\cdot0$	$b-0\cdot8$	$=c$	$d+1\cdot0$	$f+1\cdot3$	8·9	0	0	...
Dec. 30	5019	...	$a-1\cdot3$	$b-1\cdot0$	$c-0\cdot3$	$d+0\cdot2$	$f+1\cdot3$	9·1	−·1	0	...
1900 Jan. 10	5030	...	$a-1\cdot5$	$b-1\cdot0$	$c-0\cdot5$	$d-0\cdot3$	$f+1\cdot0$	9·5	−·2	0	...
Jan. 27	5047	...	$a-2\cdot0$	$c-1\cdot0$	$d-1\cdot0$	$f-1\cdot0$	$h+1\cdot0$	10·2	−·1	0	...
Feb. 6	5057	...	$a-1\cdot7$	$c-0\cdot7$	$d-1\cdot0$	$=f$	$h+1\cdot2$	9·8	−·1	0	...
											G.M.T. h m
Mar. 13	5092	...	$a-1\cdot5$	$c-0\cdot5$	$d+0\cdot3$	$f+1\cdot3$	$g+1\cdot0$	9·2	+·1	−·1	7 50
Apr. 15	5125	...	$a-1\cdot3$	$b-1\cdot0$	$c+0\cdot8$	$d+1\cdot2$	$f+1\cdot3$	8·8	+·1	0	9 20
May 24	5164	...	$a-1\cdot5$	$b-1\cdot0$	$c-0\cdot2$	$d+0\cdot7$	$f+1\cdot2$	9·2	−·1	0	10 0
June 17	5188	...	$a-1\cdot7$	$b-0\cdot5$	$c-0\cdot7$	$d+0\cdot7$	$f+1\cdot2$	9·2	−·1	0	10 20
July 14	5215	...	$a-2\cdot0$	$c-1\cdot0$	$d-1\cdot0$	$f+0\cdot2$	$h+1\cdot5$	9·9	−·1	0	10 50
Aug. 18	5250	...	$a-2\cdot0$	$c-1\cdot0$	$d-0\cdot7$	$f+0\cdot2$	$h+0\cdot8$	9·9	−·1	0	9 40
Sept. 8	5271	...	$a-1\cdot5$	$c-1\cdot0$	$d-0\cdot6$	$f+0\cdot6$	$h+1\cdot3$	9·6	−·1	0	10 20
Sept. 24	5287	...	$a-1\cdot5$	$c-1\cdot0$	$d-0\cdot2$	$f+0\cdot6$	$h+1\cdot3$	9·6	−·1	0	9 50
Oct. 8	5301	...	$a-1\cdot3$	$b-1\cdot0$	$=c$	$d+0\cdot7$	$f+1\cdot0$	9·1	0	0	7 30
Oct. 21	5314	...	$a-1\cdot3$	$b-0\cdot8$	$=c$	$d+0\cdot3$	$f+1\cdot0$	9·2	0	0	7 40
Nov. 15	5339	...	$a-1\cdot0$	$b-0\cdot5$	$=c$	$d+0\cdot3$	$f+1\cdot2$	9·0	0	0	6 10
Nov. 29	5353	...	$a-1\cdot5$	$b-1\cdot2$	$c-0\cdot7$	$d-0\cdot2$	$f+0\cdot7$	9·6	−·2	0	9 50
Dec. 13	5367	...	$a-1\cdot5$	$c-0\cdot7$	$=d$	$f+1\cdot0$	$h+1\cdot3$	9·4	0	0	6 10

R Draconis.

R. A. $16^h\ 32^m\ 24^s$. Dec. $+66°\ 57'{\cdot}8$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1889 Apr. 22	1115	...	3−1·5	4−1·0	6−0·3	7+1·5	=9	9·1	−·1	+·2	−·4
May 4	1127	...	3−0·5	4−0·3	6+0·6	9+0·4	...	8·5	0	+·3	0
May 20	1143	...	1−2·0, 9+1·5	2−0·3	=3	4+1·0	6+1·5	7·7	+·1	+·2	−·2
June 12	1166	...	=3	4+1·0	6+2·0	9+1·5	...	7·4	+·2	+·3	−·9
July 2	1186	...	3−1·2	4−0·7	6+0·5	8+1·0	9+0·3	8·7	+·1	+·3	−·5
July 21	1205	...	5+1·0, 17+2·0	6−1·5	7+0·3	9−1·5	16+0·5	9·9	+·1	+·3	−·1
Aug. 7	1222	...	=5	6−2·0	7−1·5	16−0·3	17+1·0	11·0	−·1	+·3	+·2
Aug. 29	1244	...	5−0·5	7−2·0	=17	18+0·5	19+0·5	11·6	0	+·3	+·3
Sept. 24	1270	132	17−0·6	18−0·6	...	...	...	12·4	−·2	+·3	+·5
Sept. 30	1276	132	17−0·3	18−1·0	19−0·5	...	...	12·5	−·2	+·3	+·6
Oct. 19	1295	80	7−2·0	=17	=18	19+0·5	23+0·5	11·8	0	+·3	+·4
Nov. 12	1319	...	6−1·3	7−1·0	9−1·6	16+0·5	...	10·2	−·1	+·3	−·1
Dec. 3	1340	...	2−2·0	3−1·0	6+1·0	7+2·0	9+0·5	8·6	+·1	+·2	+·4
Dec. 11	1348	...	1−2·0	2−1·0	3−0·2	6+2·0	9+1·3	8·0	−·1	+·1	0
Dec. 24	1361	...	1−1·0	2+0·3	3+1·0	4+1·5	9+2·0	7·1	+·2	+·1	−·2
1890 Jan. 1	1369	...	1−0·7	2+0·5	3+2·0	6+3·0	9+2·5	6·5	+·2	+·1	−·7
Jan. 10	1378	...	1−0·6, 9+2·0	2+0·7	3+1·5	6+2·5	7+2·5	6·9	+·2	+·1	−·4
Feb. 2	1401	...	1−1·5	3+1·0	4+1·0	6+2·0	9+1·5	7·3	+·2	+·2	−·3
Feb. 22	1421	...	2−1·0	3+0·5	6+2·0	7+2·5	9+1·5	7·6	+·2	+·2	−·6
Mar. 3	1430	...	3−0·7	4−0·5	6+1·0	7+1·5	9+0·7	8·4	+·1	+·2	−·4
Mar. 19	1446	...	3−1·5	5+1·0	6−0·2	7+0·3	9−0·7	9·6	−·1	+·2	−·1
Apr. 3	1461	...	7−0·2	8−1·0	=11	13+1·0	=16	10·2	0	+·3	−·1
Apr. 29	1487	...	17+0·5	...	...	...	...	11·4	+·2	+·4	+·7
May 12	1500	...	5−1·0	15−0·5	=17	18−0·5	=19	12·0	−·1	+·3	+·1
May 26	1514	80	17−0·5	18−1·0	19−0·8	...	...	12·7	−·2	+·3	+·6
June 19	1538	...	5−1·2	17−0·2	18−0·5	22−1·5	...	12·3	−·2	+·4	+·1
July 5	1554	80	5−0·8	17+0·5	=18	21−1·0	22−0·5	11·7	−·1	+·4	−·1
July 22	1571	...	5+0·3	7−0·6	20−0·3	21−0·1	22+1·0	10·3	0	+·4	−·2
Aug. 13	1593	...	3−1·5	6+0·2	7+1·5	9+0·5	20+1·3	8·7	+·2	+·3	+·1
Aug. 31	1611	...	2−1·0	3+1·0	6+2·0	7+2·5	9+2·0	7·4	+·2	+·2	−·5
Sept. 6	1617	...	1−1·0	2−0·3	3+0·7	6+1·5	7+2·0	7·7	+·1	+·1	−·2
Sept. 11	1622	...	1−1·5	2−0·5	3+1·0	6+1·5	7+2·0	7·8	+·1	+·1	0
Sept. 27	1638	...	2−1·0	3+0·5	6+1·8	7+2·3	9+1·3	7·7	+·2	+·2	+·1
Oct. 3	1644	...	2−1·0	3+0·2	6+1·5	7+2·0	9+1·5	7·9	+·2	+·2	+·1
Oct. 14	1655	...	2−1·5	3−0·2	6+1·5	9+1·3	20+2·0	8·0	+·1	+·3	−·2
Nov. 5	1677	...	3−1·5	=6	7+0·8	9−0·5	16+1·5	9·1	0	+·2	−·1
Nov. 26	1698	...	6−1·3	=7	16+0·6	=20	21+1·0	9·8	+·1	+·4	−·1
Dec. 19	1721	...	7−1·5	17+1·0	20−1·0	=21	22+0·7	10·8	0	+·4	−·2
1891 Jan. 10	1743	80	17+0·2	18−0·6	19−0·6	21−1·0	22−0·2	11·9	−·1	+·4	+·4
Feb. 15	1779	80	17+0·5	20−1·5	21−1·0	22−0·5	...	11·4	−·1	+·5	−·2

R Draconis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1891 Feb. 26	1790	...	5−1·0	17+1·0	20−1·3	21−1·0	=22	11·3	−·1	+·4	0
Mar. 30	1822	...	3−1·0	6+0·4	7+0·8	=9	20+2·0	8·7	+·1	+·3	−·1
Apr. 15	1838	...	2−1·3	3−0·5	6+1·5	7+2·3	9+1·2	8·1	+·1	+·2	+·2
May 2	1855	...	1−1·5	3+1·0	6+2·0	7+2·5	16+1·5	7·7	+·2	+·2	+·5
May 14	1867	...	1−0·7	2+0·7	3+1·3	6+1·7	7+2·0	7·3	+·2	+·1	+·3
May 26	1879	...	1−1·0	2+0·5	3+1·5	6+2·0	7+2·5	7·2	+·2	+·1	+·3
June 2	1886	...	1−1·3	2+0·3	3+1·3	7+2·0	...	7·5	+·2	0	+·3
June 9	1893	...	1−1·3 9+1·5	2+0·7	3+1·0	6+2·0	7+2·5	7·2	+·2	+·1	0
June 20	1904	...	2−1·0	3+0·5	6+1·6	7+2·2	9+1·2	7·8	+·2	+·2	+·2
July 8	1922	...	2−1·5	3−0·7	6+0·5	7+1·3	9+0·4	8·7	+·1	+·2	0
July 19	1933	...	6−0·5	7+1·0	9−0·7	20+1·0	22+2·0	9·0	+·1	+·5	0
Aug. 10	1955	...	7−1·2	17+1·0	20−1·0	=21	22+1·0	10·6	0	+·4	+·3
Aug. 29	1974	...	5−1·0	17+0·5	20−2·3	21−1·5	22−0·5	11·8	−·1	+·4	+·5
Sept. 9	1985	...	5−0·6 22−0·5	17−0·2	=18	=19	21−1·0	11·9	−·1	+·3	−·1
Sept. 14	1990	80	17−0·3	20−3·0	21−2·0	22−0·8	...	12·3	−·2	+·5	+·3
Sept. 27	2003	80	17−0·8	19−0·5	21−2·0	22−1·3	23−0·2	12·6	−·2	+·4	+·4
Oct. 10	2016	80	17+0·5	18−0·7	=19	21−1·5	22−0·7	12·0	−·1	+·4	+·4
Oct. 28	2034	...	17+0·3	18−0·3	=19	21−1·3	22−0·3	11·9	−·1	+·4	+·8
Nov. 23	2060	...	6−1·0	7−0·2	9−0·8	20+0·7	21+1·5	9·6	−·1	+·4	−·4
Dec. 2	2069	...	3−2·0	6−0·6	=7	9−1·0	20+0·6	9·7	−·1	+·3	−·1
Dec. 17	2084	...	1−3·0	3−1·0	6+0·6	7+2·0	9+0·6	8·7	+·1	+·2	0
1892 Jan. 27	2125	...	1+0·4	2+1·4	3+2·0	6+2·3	9+2·0	6·4	+·3	+·1	−·9
Feb. 21	2150	...	1−2·5 9+1·5	2−1·3	3+1·5	6+2·5	7+2·5	7·3	+·1	+·1	−·7
Mar. 5	2163	...	3−0·5	6+0·7	7+1·5	9+0·7	...	8·3	+·2	+·2	−·1
Mar. 12	2170	...	1−3·0	3−1·5	6+0·6	7+2·0	9+0·3	8·8	+·1	+·2	−·1
Mar. 29	2187	...	6−1·3	=7	9−2·0	20+0·5	21+0·5	10·1	0	+·4	+·3
Apr. 7	2196	...	6−1·5	7−1·0	=20	21+0·5	22+1·0	10·2	0	+·4	0
Apr. 24	2213	80	7−2·5	17+0·5	20−1·3	21−1·3	22−0·3	11·6	−·1	+·4	+·5
May 20	2239	80	7−3·0	17+0·5	20−2·0	21−1·5	22−1·0	12·0	−·1	+·4	0
June 15	2265	...	17−1·0	...	...	...	...	12·9	−·2	+·4	+·6
July 4	2284	...	17−0·2	20−3·0	21−2·0	22−1·0	...	12·3	−·2	+·5	+·2
July 23	2303	...	7−2·0	17+0·3	20−1·5	21−0·5	=22	11·3	−·1	+·4	−·1
Aug. 17	2328	...	3−2·0	6−0·3	7+0·5	=9	20+1·3	9·2	0	+·3	−·4
Aug. 25	2336	...	3−1·2	6+0·3	7+1·0	9−0·2	20+1·2	8·9	+·1	+·3	+·2
Sept. 7	2349	...	2−1·3	=3	6+1·2	7+1·5	9+1·2	8·2	+·1	+·2	−·1
Sept. 24	2366	...	1−1·5	2−0·5	3+1·0	6+1·5	7+2·0	7·8	+·1	+·1	0
Oct. 8	2380	...	1−1·5	2−0·3	3+1·0	6+2·0	9+2·0	7·4	+·1	+·1	−·4
Oct. 15	2387	...	1−1·2	2−0·6	3+0·7	6+1·3	9+1·3	7·7	+·1	+·1	−·3
Oct. 19	2391	...	1−2·0	2−1·3	3+0·5	7+2·0	9+1·3	8·1	+·1	+·1	+·1
Oct. 25	2397	...	1−1·5	2−0·7	3+0·5	6+1·6	7+2·0	7·9	+·1	+·1	−·4
Nov. 9	2412	...	2−1·5	3−1·3	6+1·0	7+1·5	9+0·5	8·7	+·1	+·2	0
Nov. 29	2432	...	3−1·5	6−0·6	9−1·0	20+0·3	21+1·5	9·6	−·1	+·3	0
Dec. 12	2445	...	6−1·5	7−0·7	20−0·7	21−0·3	22+0·5	10·5	−·1	+·4	+·5

R DRACONIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1892 Dec. 29	2462	...	6−2·5	9−2·5	20−1·0	21−0·2	22+1·0	10·8	−·1	+·5	(+·3)
1893 Jan. 11	2475	...	*n*−1·0	=*o*	*r*−0·5	*u*+1·0	...	12·1	0	+·2	(+ ·9)
Feb. 8	2503	80	*p*−3·0	*r*−1·0	*t*−1·0	*u*−0·5	...	14·3	−·1	0	(+2·0)
Mar. 4	2527	80	*n*−1·0	=*o*	*p*−1·0	*q*+1·0	=*r*	11·8	0	+·1	+ ·6
Mar. 10	2533	...	*k*−2·0	*k*−2·0	*m*+0·2	*q*+1·3	*r*+0·2	11·1	0	0	+ ·1
Mar. 16	2539	...	*l*−0·3	*m*+0·5	*q*+2·0	*r*+1·0	...	10·3	+·1	0	− ·3
Mar. 30	2553	...	*f*−1·8	*k*−1·3	*k*−1·0	*n*+0·7	*o*+2·0	10·1	0	+·2	+ ·3
Apr. 14	2568	...	*f*−1·2	*g*−1·0	=*k*	*k*+0·5	*l*+1·0	9·2	0	0	+ ·1
May 4	2588	...	*a*−1·2	*f*+0·7	*g*+1·0	*k*+1·3	*k*+1·6	7·8	+·1	0	− ·2
May 13	2597	...	*a*−1·2	*f*+1·0	*g*+1·2	*k*+1·5	*k*+2·0	7·6	+·1	0	+ ·2
May 25	2609	...	*a*−1·0	*f*+1·2	*g*+1·5	*k*+2·0	*k*+2·0	7·4	+·1	0	(+ ·1)
June 2	2617	...	*a*−0·7	*f*+1·3	*g*+1·3	*k*+1·5	*k*+2·0	7·4	+·1	0	(+ ·1)
June 8	2623	...	*a*−1·0	*f*+1·3	*g*+1·0	*k*+1·5	*k*+1·5	7·6	+·1	0	(+ ·2)
June 30	2645	...	*a*−1·5	*f*+1·0	*k*+1·7	*k*+2·0	*o*+3·0	7·7	+·1	+·1	(− ·1)
July 22	2667	...	*f*−1·3	*k*+0·6	*k*+0·6	*n*+2·5	*o*+3·0	8·6	+·1	+·2	(− ·1)
Aug. 8	2684	...	*f*−2·0	*k*−1·3	*k*−0·3	*n*+2·0	*o*+3·0	9·4	0	+·2	− ·3
Aug. 24	2700	...	*k*−2·5	*k*−2·5	*l*+1·0	*n*+0·5	*o*+1·2	10·5	0	+·2	0
Sept. 7	2714	...	*k*−2·5	*k*−2·0	*n*−1·3*	*o*−0·3	*q*+0·5	12·1	0	+·2	+ ·8
Sept. 30	2737	80	*n*−2·0	*o*−1·5	*q*−1·0	...	...	12·7	−·1	+·2	+ ·4
Oct. 7	2744	80	*n*−2·5	*o*−1·5	*q*−1·0	...	...	12·9	−·1	+·2	+ ·3
Oct. 18	2755	80	*n*−2·3	*o*−1·0	*q*−0·6	...	...	12·5	−·1	+·2	+ ·1
Nov. 6	2774	...	*k*−3·0	*k*−3·0	*n*−1·0	*o*−0·3	*q*+0·3	11·8	−·1	+·2	+ ·4
Nov. 12	2780	...	*k*−2·0	*k*−2·0	=*n*	*o*+1·0	*q*+1·3	10·7	0	+·2	− ·3
Dec. 2	2800	...	*f*−2·0	*k*−1·0	*k*−0·5	*n*+2·0	*o*+2·6	9·5	0	+·2	− ·1
Dec. 16	2814	...	*a*−2·5	*f*−1·3	*k*+0·5	*k*+1·0	...	9·0	0	0	+ ·2
1894 Jan. 23	2852	...	*a*−1·0	*f*+1·3	*k*+1·6	*k*+2·0	...	7·4	+·1	0	0
Feb. 3	2863	...	*a*−1·0	*f*+1·3	*g*+1·3	*k*+1·6	*k*+2·0	7·4	+·1	0	− ·1
Feb. 8	2868	...	*a*−1·0	*f*+1·0	*k*+1·6	*k*+2·0	...	7·5	+·1	0	− ·1
Feb. 21	2881	...	*a*−1·5	*f*+1·3	*g*+1·6	*k*+1·6	*k*+2·0	7·5	+·1	0	− ·7
Mar. 4	2892	...	*a*−1·0	*f*+0·2	*g*+1·0	*k*+1·3	*k*+1·3	7·9	+·1	0	− ·7
Mar. 11	2899	...	*a*−1·5	*f*−0·3	=*g*	*k*+0·3	*k*+1·0	8·6	0	0	− ·4
Mar. 21	2909	...	*f*−1·5	*g*−1·0	*k*−0·5	=*k*	*o*+2·0	9·5	−·1	+·1	0
Apr. 1	2920	...	*k*−1·0	*k*−1·0	*n*+2·0	*o*+1·5	*q*+2·5	9·6	0	+·2	− ·2
Apr. 22	2941	80	*n*−0·5	=*o*	*q*+1·0	...	...	11·0	0	+·2	0
May 1	2950	80	=*n*	=*o*	*q*+1·0	...	...	10·9	0	+·2	− ·5
May 18	2967	132	*n*−2·0	*o*−1·0	*q*+0·5	...	...	12·0	0	+·2	− ·1
June 13	2993	132	*n*−2·0	*o*−1·0	*q*−0·3	...	...	12·3	−·1	+·2	− ·1
June 28	3008	...	*n*−1·2	*o*−0·5	=*q*	...	...	11·8	−·1	+·2	− ·3
July 18	3028	...	*k*−2·5	*k*−2·5	*n*−1·0	=*o*	*q*+1·0	11·4	0	+·2	+ ·2
Aug 15	3056	...	*f*−2·0	*k*−1·0	*k*−0·5	*n*+1·3	*o*+2·0	9·7	0	+·2	+ ·1

*1893 September 7. The original record for *n* is *n* + 1·3, but this has been assumed to be an error.

R Draconis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1894 Aug. 30	3071	...	$a-1\cdot2$	$f-0\cdot3$	$g+0\cdot3$	$h+1\cdot0$	$k+1\cdot0$	8·3	0	0	$-\cdot4$
Sept. 8	3080	...	$a-1\cdot0$	$f+1\cdot0$	$g+1\cdot3$	$h+1\cdot3$	$k+1\cdot3$	7·7	$+\cdot1$	0	$-\cdot3$
Sept. 29	3101	...	$a-1\cdot0$	$f+1\cdot0$	$g+1\cdot3$	$h+1\cdot3$	$k+1\cdot3$	7·7	$+\cdot1$	0	$+\cdot1$
Oct. 22	3124	...	$a-1\cdot0$	$f+0\cdot5$	$g+1\cdot3$	$h+2\cdot0$	$k+2\cdot0$	7·5	$+\cdot1$	0	$-\cdot2$
Nov. 3	3136	...	$a-1\cdot0$	$f+0\cdot2$	$g+1\cdot0$	$h+1\cdot3$	$k+1\cdot3$	7·9	$+\cdot1$	0	0
Nov. 15	3148	...	$a-1\cdot5$	$f-0\cdot5$	$h+1\cdot2$	$k+1\cdot5$	$n+2\cdot5$	8·3	0	0	$-\cdot1$
Dec. 1	3164	...	$f-1\cdot5$	$g-0\cdot7$	$h-0\cdot3$	$k+0\cdot3$	$n+2\cdot0$	9·2	0	$+\cdot1$	0
Dec. 20	3183	...	$h-1\cdot3$	$k-1\cdot3$	$n+1\cdot0$	$o+2\cdot0$	$q+2\cdot0$	9·9	0	$+\cdot2$	$-\cdot5$
1895 Jan. 18	3212	...	$k-2\cdot0$	$n-1\cdot0$	$=o$	$q+1\cdot0$	...	11·3	0	$+\cdot2$	$-\cdot3$
Feb. 11	3236	80	$k-3\cdot0$	$n-1\cdot0$	$=o$	$q+0\cdot5$	...	11·7	0	$+\cdot2$	$-\cdot2$
Feb. 17	3242	132	$n-2\cdot0$	$o-1\cdot0$	$q-0\cdot3$	...	...	12·3	$-\cdot1$	$+\cdot2$	$+\cdot4$
Mar. 17	3270	80	$h-3\cdot0$	$k-3\cdot0$	$n-1\cdot2$	$o-0\cdot4$	$q+0\cdot6$	11·8	$-\cdot1$	$+\cdot2$	$+\cdot4$
Mar. 28	3281	...	$h-2\cdot0$	$k-1\cdot5$	$=n$	$o+0\cdot7$	$q+1\cdot5$	10·7	0	$+\cdot2$	$-\cdot1$
Apr. 12	3296	...	$f-2\cdot0$	$h-1\cdot3$	$k-1\cdot3$	$n+1\cdot3$	$o+2\cdot0$	10·0	0	$+\cdot2$	$-\cdot1$
May 4	3318	...	$a-2\cdot0$	$f-1\cdot3$	$g+0\cdot5$	$h+1\cdot0$	$k+1\cdot0$	8·7	0	0	$-\cdot3$
May 16	3330	...	$a-1\cdot3$	$f+1\cdot0$	$g+1\cdot0$	$h+1\cdot5$	$k+2\cdot0$	7·7	$+\cdot1$	0	$-\cdot4$
June 2	3347	...	$a-1\cdot2$	$f+1\cdot0$	$g+1\cdot3$	$h+1\cdot3$	$k+1\cdot8$	7·7	$+\cdot1$	0	$+\cdot1$
June 23	3368	...	$a-1\cdot0$	$f+0\cdot7$	$g+1\cdot0$	$h+1\cdot3$	$k+1\cdot6$	7·8	$+\cdot1$	0	0
June 27	3372	...	$a-1\cdot5$	$f+1\cdot0$	$g+1\cdot4$	$h+1\cdot4$	$k+1\cdot6$	7·7	$+\cdot1$	0	$-\cdot2$
July 12	3387	...	$a-1\cdot5$	$f-0\cdot7$	$=g$	$h+1\cdot0$	$k+1\cdot0$	8·5	0	0	$-\cdot1$
July 28	3403	...	$a-2\cdot5$	$f-1\cdot3$	$g-1\cdot0$	$h-0\cdot5$	$=k$	9·6	$-\cdot2$	0	$+\cdot1$
Aug. 15	3421	...	$h-1\cdot1$	$k-1\cdot1$	$=n$	$o+1\cdot0$	$q+2\cdot0$	10·2	0	$+\cdot2$	$+\cdot4$
Aug. 28	3434	...	$h-1\cdot5$	$k-1\cdot2$	$n-0\cdot5$	$=o$	$q+1\cdot0$	10·8	0	$+\cdot2$	$+\cdot3$
Sept. 13	3450	...	$h-2\cdot2$	$k-2\cdot2$	$n-0\cdot8$	$o-0\cdot3$	$q+0\cdot8$	11·3	$-\cdot1$	$+\cdot2$	$+\cdot1$
Sept. 25	3462	80	$k-2\cdot5$	$n-1\cdot0$	$=o$	$q-0\cdot5$	...	11·8	$-\cdot1$	$+\cdot2$	$+\cdot2$
Oct. 16	3483	80	$m-0\cdot5$	$n-1\cdot5$	$o-0\cdot5$	$=q$	...	11·6	$-\cdot1$	$+\cdot2$	$-\cdot2$
Oct. 26	3493	...	$h-2\cdot5$	$k-2\cdot5$	$n-1\cdot3$	$o-0\cdot5$	$=q$	11·8	$-\cdot1$	$+\cdot2$	$+\cdot1$
Nov. 9	3507	...	$h-1\cdot5$	$k-1\cdot5$	$n-0\cdot5$	$o+0\cdot5$	$q+1\cdot0$	10·8	0	$+\cdot2$	$-\cdot4$
Nov. 30	3528	...	$a-2\cdot0$	$g-1\cdot0$	$h-1\cdot0$	$k-0\cdot3$	$n+1\cdot0$	9·7	$-\cdot1$	$+\cdot1$	$-\cdot5$
Dec. 10	3538	...	$a-1\cdot3$	$h-0\cdot2$	$k-0\cdot2$	$n+1\cdot5$	$o+2\cdot0$	9·1	0	$+\cdot1$	$-\cdot4$
Dec. 16	3544	...	$a-2\cdot0$	$f-1\cdot3$	$h+0\cdot3$	$k+0\cdot6$	$n+2\cdot0$	9·0	0	0	$-\cdot2$
1896 Jan. 15	3574	...	$a+0\cdot3$	$f+1\cdot3$	$g+1\cdot3$	$h+1\cdot5$	$k+2\cdot0$	7·2	$+\cdot2$	0	$+\cdot2$
Jan. 22	3581	...	$=a$	$f+1\cdot3$	$g+1\cdot3$	$h+1\cdot5$	$k+1\cdot8$	7·5	$+\cdot2$	0	$+\cdot8$
Jan. 28	3587	...	$a-0\cdot5$	$f+1\cdot0$	$g+1\cdot3$	$k+1\cdot5$	$n+1\cdot2$	7·9	$+\cdot1$	0	$+1\cdot1$
Feb. 4	3594	...	$a-1\cdot0$	$f+1\cdot0$	$g+1\cdot0$	$h+1\cdot3$	$k+1\cdot5$	7·7	$+\cdot1$	0	$+\cdot8$
Feb. 20	3610	...	$a-1\cdot0$	$f+1\cdot0$	$g+1\cdot0$	$h+1\cdot5$	$k+1\cdot5$	7·7	$+\cdot1$	0	$+\cdot4$
Mar. 23	3642	...	$a-1\cdot5$	$f-0\cdot5$	$g-0\cdot3$	$h+0\cdot7$	$k+1\cdot0$	8·6	0	0	$-\cdot1$
Apr. 8	3658	...	$f-1\cdot2$	$h-0\cdot5$	$k-0\cdot3$	$n+1\cdot0$	$o+2\cdot0$	9·5	0	$+\cdot2$	$+\cdot2$
Apr. 19	3669	...	$f-1\cdot7$	$h-1\cdot0$	$k-0\cdot5$	$m+1\cdot0$	$o+1\cdot5$	9·7	0	$+\cdot1$	$-\cdot5$
Apr. 29	3679	...	$h-1\cdot5$	$k-1\cdot5$	$n+0\cdot3$	$o+1\cdot0$	$q+1\cdot5$	10·4	0	$+\cdot2$	$-\cdot5$
May 8	3688	...	$h-2\cdot0$	$k-1\cdot5$	$=n$	$=o$	$q+1\cdot0$	10·9	0	$+\cdot2$	$-\cdot2$
May 26	3706	80	$k-2\cdot0$	$n-1\cdot0$	$o-0\cdot3$	$q+1\cdot0$	...	11·3	$-\cdot1$	$+\cdot2$	-4
June 19	3730	80	$h-2\cdot5$	$k-2\cdot5$	$n-1\cdot0$	$o-0\cdot5$	$q+0\cdot5$	11·6	$-\cdot1$	$+\cdot2$	$-\cdot2$
July 5	3746	...	$h-2\cdot3$	$k-2\cdot3$	$n-0\cdot5$	$=o$	$q+0\cdot5$	11·3	0	$+\cdot2$	$-\cdot2$
July 30	3771	...	$h-1\cdot3$	$k-1\cdot0$	$n+0\cdot7$	$o+1\cdot5$	$q+1\cdot3$	10·2	0	$+\cdot2$	$-\cdot1$
Aug. 12	3784	...	$a-2\cdot0$	$f-1\cdot0$	$g-1\cdot0$	$=h$	$=k$	9·3	$-\cdot1$	0	$-\cdot3$

R Draconis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1896 Aug. 26	3798	...	$a-2\cdot0$	$f-0\cdot6$	$=g$	$h+0\cdot6$	$k+1\cdot0$	8·7	0	0	0
Sept. 15	3818	...	$a-0\cdot5$	$f+1\cdot3$	$g+1\cdot3$	$h+2\cdot0$	$k+2\cdot0$	7·3	+·1	0	0
Sept. 26	3829	...	$a-1\cdot3$	$f+1\cdot0$	$g+1\cdot3$	$h+1\cdot5$	$k+1\cdot7$	7·7	+·1	0	+·6
Oct. 18	3851	...	$a-1\cdot3$	$f+1\cdot0$	$g+1\cdot0$	$h+1\cdot8$	$k+2\cdot0$	7·4	+·1	0	−·2
Oct. 31	3864	...	$a-1\cdot3$	$f+0\cdot3$	$g+0\cdot7$	$h+1\cdot0$	$k+1\cdot0$	8·2	+·1	0	0
Nov. 4	3868	...	$a-1\cdot3$	$f+0\cdot3$	$g+1\cdot0$	$h+1\cdot0$	$k+1\cdot3$	8·0	+·1	0	−·3
Nov. 16	3880	...	$a-2\cdot0$	$f-1\cdot0$	$=g$	$h+0\cdot7$	$k+0\cdot7$	8·8	0	0	0
Nov. 28	3892	...	$f-1\cdot5$	$g-1\cdot0$	$=h$	$k+0\cdot3$	$n+1\cdot5$	9·3	0	+·1	0
Dec. 17	3911	...	$f-2\cdot5$	$g-2\cdot0$	$h-1\cdot3$	$k-1\cdot3$	$n+1\cdot0$	10·4	−·1	+·1	0
1897 Jan. 26	3951	80	$k-2\cdot5$	$m-1\cdot0$	$n-1\cdot0$	$=o$	$q+0\cdot2$	11·5	0	+·2	(−·5)
Mar. 28	4012	...	$h-2\cdot0$	$k-2\cdot0$	$=n$	$=o$	$q+1\cdot5$	10·9	0	+·2	0
Apr. 23	4038	...	$f-1\cdot3$	$g-1\cdot0$	$h-0\cdot7$	$k-0\cdot5$	$q+2\cdot0$	9·8	−·1	0	0
May 11	4056	...	$a-2\cdot3$	$f-1\cdot0$	$g-0\cdot3$	$=h$	$k+0\cdot4$	9·1	−·1	0	+·3
May 21	4066	...	$a-1\cdot5$	$f-0\cdot2$	$g+0\cdot7$	$h+1\cdot2$	$k+1\cdot2$	8·2	0	0	0
June 2	4078	...	$a-1\cdot5$	$f+0\cdot8$	$g+1\cdot3$	$h+1\cdot3$	$k+1\cdot6$	7·8	+·1	0	+·2
June 11	4087	...	$a-1\cdot5$	$f+1\cdot0$	$g+1\cdot3$	$h+1\cdot6$	$k+1\cdot6$	7·7	+·1	0	+·2
June 20	4096	...	$a-1\cdot3$	$f+1\cdot0$	$g+1\cdot0$	$h+1\cdot3$	$k+1\cdot5$	7·8	+·1	0	0
July 12	4118	...	$a-2\cdot0$	$f+0\cdot4$	$g+0\cdot8$	$h+1\cdot6$	$k+1\cdot3$	8·1	+·1	0	(−·6)
Aug. 16	4153	...	$g-1\cdot3$	$h-1\cdot0$	$k-0\cdot7$	$n+1\cdot0$	$o+1\cdot5$	9·9	0	+·2	(−·6)
Sept. 12	4180	...	$g-3\cdot0$	$k-2\cdot3$	$n-1\cdot0$	$=o$	$q+0\cdot3$	11·5	0	+·2	+·1
Sept. 19	4187	...	$g-2\cdot3$	$k-1\cdot8$	$n-1\cdot5$	$o-0\cdot5$	$q-0\cdot2$	11·6	−·1	+·2	−·1
Oct. 1	4199	80	$h-3\cdot0$	$n-2\cdot5$	$o-1\cdot0$	$q-0\cdot3$	...	12·4	−·1	+·2	+·5
Oct. 12	4210	80	$h-3\cdot0$	$k-4\cdot0$	$n-2\cdot0$	$o-1\cdot0$	$q-1\cdot0$	12·6	−·1	+·2	+·6
Oct. 20	4218	80	$h-4\cdot0$	$k-4\cdot0$	$n-2\cdot5$	$o-1\cdot0$	$q-0\cdot5$	12·8	−·1	+·2	+·7
Oct. 27	4225	80	$h-4\cdot0$	$k-3\cdot0$	$n-2\cdot0$	$o-1\cdot0$	$q-1\cdot0$	12·6	−·1	+·2	+·5
Nov. 6	4235	132	$k-3\cdot0$	$n-2\cdot0$	$o-1\cdot0$	$q+0\cdot2$	...	12·3	−·1	+·2	+·3
Nov. 19	4248	...	$f-4\cdot0$	$h-3\cdot0$	$k-3\cdot0$	$n-1\cdot0$	$q+0\cdot3$	12·0	−·1	+·1	+·3
Dec. 11	4270	...	$f-2\cdot3$	$g-1\cdot5$	$h-1\cdot0$	$k-1\cdot3$	$n+0\cdot6$	10·3	−·1	+·1	(−·3)
Dec. 20	4279	...	$f-2\cdot5$	$g-1\cdot5$	$h-1\cdot5$	$k-1\cdot0$	$q+2\cdot0$	10·4	−·1	0	(+·3)
1898 Jan. 3	4293	...	$a-2\cdot5$	$f-1\cdot3$	$g-0\cdot8$	$h+0\cdot5$	$k+1\cdot0$	9·1	−·1	0	(0)
Feb. 2	4323	...	$a-1\cdot3$	$f+1\cdot3$	$g+2\cdot0$	$h+3\cdot0$	$k+3\cdot0$	6·9	+·2	0	−·5
Feb. 8	4329	...	$a-1\cdot3$	$f+1\cdot3$	$g+1\cdot0$	$h+2\cdot0$	$k+2\cdot0$	7·5	+·2	0	+·1
Feb. 20	4341	...	$a-2\cdot0$	$f+1\cdot4$	$g+1\cdot7$	$h+2\cdot0$	$k+2\cdot3$	7·4	+·2	0	−·1
Mar. 2	4351	...	$a-1\cdot3$	$f+1\cdot3$	$g+1\cdot5$	$h+1\cdot7$	$k+2\cdot0$	7·5	+·2	0	−·2
Mar. 12	4361	...	$a-1\cdot3$	$f+1\cdot0$	$g+1\cdot0$	$h+1\cdot3$	$k+2\cdot0$	7·7	+·2	0	−·3
Mar. 22	4371	...	$a-2\cdot0$	$f+0\cdot2$	$g+0\cdot3$	$h+1\cdot3$	$k+1\cdot6$	8·2	+·2	0	−·1
Apr. 12	4392	...	$f-1\cdot3$	$g-1\cdot3$	$h-0\cdot6$	$k-0\cdot2$	$n+2\cdot0$	9·5	−·2	+·1	0
Apr. 23	4403	...	$f-2\cdot0$	$h-1\cdot3$	$k-1\cdot0$	$n+2\cdot0$	$q+2\cdot5$	9·9	−·1	+·1	−·1
May 6	4416	...	$h-2\cdot0$	$k-1\cdot5$	$=n$	$o+0\cdot7$	$q+2\cdot0$	10·6	0	+·2	0
June 7	4448	80	$h-2\cdot3$	$k-2\cdot3$	$n-1\cdot0$	$=o$	$q+0\cdot3$	11·5	−·1	+·2	0
June 17	4458	80	$h-2\cdot5$	$k-2\cdot0$	$n-1\cdot0$	$o-0\cdot3$	$q+1\cdot0$	11·4	−·1	+·2	−·3
July 7	4478	...	$h-2\cdot5$	$k-2\cdot5$	$n-1\cdot0$	$=o$	$=q$	11·6	−·1	+·2	+·1
July 28	4499	...	$f-2\cdot5$	$h-1\cdot3$	$k-1\cdot6$	$o+1\cdot5$	$q+1\cdot5$	10·5	0	+·1	−·5
Aug. 13	4515	...	$f-1\cdot5$	$g-1\cdot0$	$=h$	$k-0\cdot5$	$n+1\cdot0$	9·6	−·1	+·1	−·9

1897 February 14. Not seen 34, 80, 132; on this date, or on February 20 and March 6.

R DRACONIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1898 Aug. 25	4527	...	$f-1\cdot3$	$g-1\cdot0$	$h+0\cdot2$	$=k$	$q+2\cdot5$	9·4	0	0	$-\cdot4$
Sept. 1	4534	...	$f-1\cdot3$	$g-0\cdot3$	$h+1\cdot0$	$k+1\cdot3$	$q+3\cdot0$	8·8	$+\cdot1$	0	$(-\cdot4)$
Sept. 14	4547	...	$a-1\cdot3$	$f+1\cdot3$	$g+1\cdot5$	$h+2\cdot0$	$k+2\cdot0$	7·4	$+\cdot2$	0	$(-\cdot7)$
Sept. 23	4556	...	$a-0\cdot3$	$f+2\cdot0$	$g+2\cdot0$	$h+2\cdot3$	$k+2\cdot5$	6·8	$+\cdot2$	0	$-\cdot6$
Oct. 1	4564	...	$a+0\cdot2$	$f+1\cdot7$	$g+2\cdot0$	$h+2\cdot3$	$k+2\cdot5$	6·8	$+\cdot3$	0	$-\cdot2$
Oct. 9	4572	...	$a+0\cdot8$	$f+1\cdot5$	$g+2\cdot0$	$h+2\cdot0$	$k+2\cdot8$	6·7	$+\cdot3$	0	$-\cdot2$
Oct. 30	4593	...	$a-1\cdot3$	$f+1\cdot0$	$g+1\cdot5$	$h+2\cdot0$	$k+1\cdot8$	7·5	$+\cdot2$	0	$+\cdot3$
Nov. 9	4603	...	$a-1\cdot3$	$f+0\cdot3$	$g+1\cdot7$	$h+1\cdot7$	$k+2\cdot0$	7·6	$+\cdot2$	0	$+\cdot1$
Nov. 22	4616	....	$a-2\cdot0$	$f-0\cdot6$	$g+1\cdot0$	$h+1\cdot5$	$k+1\cdot5$	8·2	$+\cdot1$	0	$+\cdot1$
Dec. 9	4633	...	$f-2\cdot0$	$g-1\cdot0$	$h-0\cdot5$	$k+0\cdot5$	$o+2\cdot0$	9·5	$-\cdot1$	$+\cdot1$	$+\cdot5$
Dec. 19	4643	...	$f-2\cdot0$	$h-1\cdot2$	$k-1\cdot0$	$o+2\cdot0$	$q+2\cdot0$	10·0	0	$+\cdot1$	$+\cdot6$
Dec. 29	4653	...	$g-2\cdot5$	$h-2\cdot0$	$k-1\cdot5$	$=n$	$o+1\cdot5$	10·7	$-\cdot1$	$+\cdot2$	...
1899 Jan. 22	4677	80	$h-2\cdot5$	$k-2\cdot0$	$n-0\cdot5$	$o+0\cdot5$	$q+1\cdot0$	11·1	0	$+\cdot2$	...
Feb. 2	4688	80	$h-3\cdot0$	$k-2\cdot5$	$n-1\cdot0$	$=o$	$q+0\cdot2$	11·7	$-\cdot1$	$+\cdot2$	...
Feb. 27	4713	80	$h-3\cdot0$	$k-2\cdot5$	$n-1\cdot0$	$o-0\cdot5$	$q-0\cdot5$	11·9	$-\cdot2$	$+\cdot2$	...
Mar. 10	4724	132	$h-3\cdot0$	$k-2\cdot0$	$n-1\cdot0$	$o-0\cdot5$	$q+0\cdot3$	11·7	$-\cdot1$	$+\cdot2$	...
Apr. 7	4752	80	$k-3\cdot0$	$m-1\cdot0$	$n-1\cdot0$	$o-1\cdot0$	$q+1\cdot0$	11·7	$-\cdot1$	$+\cdot1$	...
Apr. 19	4764	80	$h-3\cdot0$	$k-2\cdot0$	$n-1\cdot0$	$=o$	$q+1\cdot0$	11·4	$-\cdot1$	$+\cdot2$	...
May 2	4777	...	$f-3\cdot0$	$h-1\cdot7$	$k-1\cdot0$	$=n$	$q+2\cdot0$	10·6	$-\cdot1$	$+\cdot1$	$(-\cdot2)$
May 28	4803	...	$a-2\cdot5$	$f+0\cdot3$	$g+1\cdot3$	$h+2\cdot0$	$k+2\cdot0$	7·9	$+\cdot2$	0	$-\cdot3$
June 3	4809	...	$a-2\cdot0$	$f+0\cdot7$	$g+1\cdot3$	$h+1\cdot7$	$k+2\cdot0$	7·8	$+\cdot2$	0	$-\cdot4$
June 8	4814	...	$a-2\cdot0$	$f+1\cdot0$	$g+1\cdot0$	$h+1\cdot5$	$k+2\cdot0$	7·8	$+\cdot2$	0	$-\cdot4$
June 14	4820	...	$a-1\cdot5$	$f+0\cdot8$	$g+1\cdot2$	$h+2\cdot0$	$k+2\cdot0$	7·6	$+\cdot2$	0	$-\cdot6$
June 23	4829	...	$a-2\cdot0$	$f+1\cdot0$	$g+1\cdot3$	$h+2\cdot0$	$k+2\cdot0$	7·6	$+\cdot2$	0	$-\cdot8$
July 4	4840	...	$a-2\cdot0$	$f-0\cdot2$	$=g$	$h+1\cdot5$	$k+2\cdot0$	8·2	0	0	$-\cdot6$
July 16	4852	...	$a-3\cdot0$	$f-1\cdot0$	$g-0\cdot3$	$h+1\cdot5$	$k+1\cdot5$	8·8	$-\cdot1$	0	$-\cdot4$
July 27	4863	...	$a-3\cdot0$	$f-1\cdot3$	$g-1\cdot0$	$h+0\cdot6$	$k+0\cdot3$	9·4	$-\cdot1$	0	$-\cdot1$
Aug. 6	4873	...	$f-2\cdot0$	$h-1\cdot0$	$k-0\cdot3$	$o+2\cdot0$	$q+2\cdot0$	9·8	$-\cdot1$	$+\cdot1$	0
Aug. 18	4885	...	$h-1\cdot6$	$k-1\cdot3$	$n+1\cdot0$	$o+2\cdot3$	$q+2\cdot5$	9·8	$+\cdot1$	$+\cdot2$	$(-\cdot2)$
Sept. 2	4900	...	$h-1\cdot5$	$k-2\cdot0$	$=n$	$o+0\cdot5$	$q+1\cdot0$	10·8	0	$+\cdot2$	...
Sept. 28	4926	80	$h-3\cdot0$	$k-3\cdot0$	$n-2\cdot0$	$o-1\cdot0$	$q-1\cdot0$	12·4	$-\cdot2$	$+\cdot2$	...
Oct. 7	4935	80	$h-3\cdot0$	$k-2\cdot5$	$n-1\cdot0$	$o-0\cdot3$	$q+1\cdot0$	11·6	$-\cdot1$	$+\cdot2$	...
Oct. 24	4952	...	$h-3\cdot5$	$k-3\cdot0$	$n-2\cdot0$	$o-1\cdot0$	$q-1\cdot0$	12·5	$-\cdot2$	$+\cdot2$	...
Nov. 6	4965	132	$n-2\cdot0$	$o-1\cdot3$	$p-3\cdot0$	$q-1\cdot0$	$r-1\cdot5$	13·3	$-\cdot2$	$+\cdot1$	...
Nov. 26	4985	132	$h-3\cdot5$	$k-3\cdot0$	$n-1\cdot5$	$o-1\cdot0$	$q-0\cdot6$	12·4	$-\cdot2$	$+\cdot2$	$+\cdot4$
Dec. 14	5003	...	$q+0\cdot5$	...	...	...	...	11·5	$+\cdot2$	0	$+\cdot1$
Dec. 25	5014	...	$f-2\cdot7$	$h-2\cdot0$	$k-1\cdot5$	$o+1\cdot0$	$q+2\cdot0$	10·6	0	$+\cdot1$	...
1900 Jan. 9	5029	...	$f-2\cdot3$	$g-1\cdot5$	$h-1\cdot3$	$k-0\cdot5$	$o+2\cdot0$	10·0	$-\cdot1$	$+\cdot1$	...
Jan. 18	5038	...	$f-1\cdot5$	$g-1\cdot0$	$=h$	$k+0\cdot5$	$n+1\cdot5$	9·3	0	$+\cdot1$	...
Feb. 1	5052	...	$a-2\cdot0$	$f+1\cdot3$	$g+1\cdot5$	$h+2\cdot0$	$k+2\cdot0$	7·5	$+\cdot2$	0	...
Feb. 11	5062	...	$a-1\cdot3$	$f+1\cdot0$	$g+1\cdot7$	$h+2\cdot3$	$k+2\cdot7$	7·2	$+\cdot2$	0	...
Feb. 17	5068	...	$a-1\cdot5$	$f+1\cdot0$	$g+1\cdot0$	$h+2\cdot0$	$k+2\cdot7$	7·4	$+\cdot2$	0	...
Mar. 1	5080	...	$a-1\cdot6$	$f+1\cdot3$	$g+2\cdot0$	$h+2\cdot7$	$k+3\cdot0$	7·0	$+\cdot2$	0	...
											G.M.T. h m
Mar. 12	5091	...	$a-2\cdot0$	$f+1\cdot0$	$g+1\cdot0$	$h+1\cdot5$	$k+2\cdot2$	7·8	$+\cdot2$	0	7 50
Mar. 26	5105	...	f 1·3	g 1·0	$h+1\cdot0$	$k+1\cdot5$	$n+3\cdot0$	8·6	$+\cdot1$	$+\cdot1$	9 40

R Draconis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections. Scale.	Corrections. Stars.	G.M.T.
											h m
1900 Apr. 15	5125	...	$f-2\cdot0$	$g-1\cdot5$	$h-1\cdot0$	$k-0\cdot7$	$n+2\cdot5$	9·8	−·2	+·1	9 30
May 3	5143	...	$h-2\cdot0$	$k-1\cdot5$	$n+1\cdot0$	$o+1\cdot0$	$q+2\cdot0$	10·3	0	+·2	10 0
May 24	5164	...	$h-2\cdot0$	$k-2\cdot8$	$=n$	$o+0\cdot5$	$q+0\cdot8$	11·1	0	+·2	10 10
June 17	5188	...	$h-1\cdot5$	$k-2\cdot0$	$n-1\cdot0$	$o-0\cdot5$	$q+0\cdot5$	11·3	−·1	+·2	10 30
July 14	5215	80	$h-2\cdot5$	$k-3\cdot0$	$n-1\cdot0$	$o-0\cdot5$	$q-0\cdot5$	11·9	−·2	+·2	10 40
Aug. 14	5246	...	$h-1\cdot7$	$k-2\cdot0$	$n-0\cdot8$	$o+0\cdot2$	$q+1\cdot0$	11·1	0	+·2	10 10
Aug. 31	5263	...	$h-0\cdot7$	$k-0\cdot3$	$n+1\cdot0$	$o+1\cdot7$	$q+2\cdot0$	9·7	+·1	+·2	10 0
Sept. 8	5271	...	$f-2\cdot0$	$g-1\cdot0$	$=h$	$k+0\cdot7$	$n+2\cdot0$	9·3	0	+·1	10 30
Sept. 15	5278	...	$f-1\cdot0$	$g-0\cdot3$	$h+1\cdot6$	$k+1\cdot3$	$o+3\cdot0$	8·4	+·1	+·1	10 0
Sept. 25	5288	...	$a-2\cdot0$	$f+1\cdot5$	$g+2\cdot0$	$h+2\cdot0$	$k+2\cdot0$	7·4	+·2	0	9 20
Oct. 3	5296	...	$a-1\cdot0$	$f+2\cdot0$	$g+2\cdot5$	$h+2\cdot7$	$k+3\cdot0$	6·6	+·2	0	10 0
Oct. 10	5303	...	$a-1\cdot3$	$f+1\cdot7$	$h+2\cdot5$	$k+3\cdot0$	$q+4\cdot0$	7·2	+·2	0	8 0
Oct. 19	5312	...	$a-0\cdot7$	$f+1\cdot5$	$h+2\cdot5$	$k+2\cdot5$	$q+4\cdot0$	7·2	+·2	0	8 0
Oct. 26	5319	...	$a-1\cdot0$	$f+1\cdot7$	$g+2\cdot3$	$h+2\cdot3$	$k+3\cdot0$	6·8	+·2	0	9 10
Nov. 2	5326	...	$a-1\cdot7$	$f+1\cdot4$	$g+2\cdot5$	$h+2\cdot5$	$k+2\cdot5$	7·0	+·2	0	7 10
Nov. 8	5332	...	$a-2\cdot0$	$f+1\cdot3$	$g+2\cdot0$	$h+2\cdot0$	$k+2\cdot3$	7·3	+·2	0	9 40
Nov. 29	5353	...	$a-2\cdot5$	$f-0\cdot2$	$g+1\cdot3$	$h+2\cdot0$	$k+2\cdot5$	7·8	+·1	0	7 40
Dec. 13	5367	...	$a-2\cdot0$	$f-1\cdot3$	$g-0\cdot3$	$h+0\cdot7$	$k+1\cdot0$	8·8	−·1	0	6 20

S Herculis.

R. A. $16^h\ 47^m\ 20^s$. Dec. $+15°\ 6'{\cdot}6$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1887 Apr. 18	0380	...	6−2·0	8+1·0	11+0·2	=19	21+0·5	9·8	+·1	+·2	...
May 16	0408	...	6−3·0	8−0·5	11−1·0	19−0·5	21−1·5	11·0	−·2	+·2	...
June 10	0433	132	8−1·5	19−1·5	=27	=28	=29	11·9	−·1	+·1	...
June 27	0450	80	8−2·0, 29−0·5	19−2·0	=26	27−0·5	28−0·5	12·4	−·2	+·1	...
Aug. 8	0492	132	=27	28−0·5	29−0·5	...	...	12·4	−·1	0	...
Sept. 18	0533	...	6−2·0	7−1·5	8+1·0	9+0·3	11+0·3	9·9	+·1	+·3	...
Oct. 10	0555	...	6−0·3	8+2·5	11+2·0	...	...	8·1	+·1	+·3	...
Oct 17	0562	...	5−1·0	6−0·7	7−0·6	11+1·0	...	9·4	−·1	+·1	...
Nov. 4	0580	...	3−2·0	4−1·0	5−0·4	6+0·5	7+0·5	9·1	−·1	−·1	...
Nov. 19	0595	...	1−1·5	4−0·3	=5	6+1·0	7+1·0	8·1	0	−·1	...
Nov. 29	0605	...	1−2·0	4+0·2	5+1·0	6+2·3	7+2·0	7·4	+·2	−·1	...
Dec. 7	0613	...	3−0·5	=4	5+0·5	6+1·5	7+1·5	8·0	+·1	−·1	...
Dec. 20	0626	...	2−1·0	3−0·3	4+1·0	5+1·5	7+2·0	7·7	+·1	−·1	...
1888 Apr. 14	0742	80	19−2·0	...	...	...	...	12·5	−·2	+·1	...
May 14	0772	132	19−2·0	27−0·5	28−0·5	29−1·0	...	12·7	−·2	0	...
July 8	0827	...	=8	11−0·5	14+1·5	=19	21−0·5	10·0	−·1	+·2	...
July 20	0839	...	6−1·3	8+0·7	9−0·2	=10	11+0·5	9·7	0	+·3	...
Aug. 9	0859	...	4−1·0	5−1·0	6−0·5	7−0·5	11+1·5	9·2	−·2	0	...
Aug. 26	0876	...	5−1·0	6−0·5	=7	9+1·0	11+1·5	9·0	0	+·1	...
Sept. 6	0887	...	4−0·6	5−0·5	=6	7+0·3	11+1·0	8·9	0	0	...
Sept. 13	0894	...	3−1·5	4−0·5	5−0·2	6+0·2	7+1·0	8·8	−·1	−·1	...
Sept. 21	0902	...	1−1·5, 7+2·0	3−1·0	=4	5+0·3	6+2·0	7·8	+·1	−·1	...
Sept. 30	0911	...	1−1·0, 7+2·5	=3	4+0·5	5+1·0	6+2·0	7·1	+·2	−·1	...
Oct. 9	0920	...	1−1·0	3−0·7	4+1·3	5+2·0	7+3·0	7·1	+·1	−·1	...
Oct. 15	0926	...	1−0·5, 7+3·0	3+1·5	4+1·5	5+2·0	6+3·0	6·3	+·2	−·1	...
Oct. 19	0930	...	3+1·0	4+1·3	5+1·6	6+2·0	7+2·0	7·0	+·3	−·1	...
Oct. 30	0941	...	2−2·0	3−1·0	4+1·0	5+0·3	7+1·0	8·4	+·1	−·1	...
Nov. 30	0972	...	4−1·0, 9+2·0	5−1·0	6−0·5	7+0·3	8+2·5	8·6	0	+·2	...
1889 Apr. 18	1111	...	8−1·0, =25	9−1·0	17−0·5	18−0·5	=24	11·0	−·1	+·4	...
Apr. 25	1118	...	8−0·6, 25+0·3	9−1·0	=17	=18	24+0·3	10·7	0	+·4	...
May 19	1142	...	4−2·0	5−1·5	6−1·0	7−0·7	11+1·0	9·7	−·2	0	...
June 4	1158	...	3−2·0	4−1·3	5−0·7	6+0·3	7+0·3	9·3	−·1	−·1	...
June 13	1167	...	2−2·0	4−1·5	5−0·3	6+0·5	7+0·3	9·0	−·1	0	...
June 18	1172	...	3−2·0	4−1·0	5−0·4	6+0·2	7+0·5	9·1	−·1	−·1	...
June 29	1183	...	1−2·5	4−1·0	5−1·0	6−0·5	7+1·0	8·9	−·2	−·1	...
July 5	1189	...	4−1·0	5−0·3	6+0·2	7+1·0	11+2·0	8·5	+·1	0	...
July 17	1201	...	2−2·0	3−1·0	4+0·2	5+0·5	6+1·0	8·5	+·1	−·1	...

S Herculis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections. Scale.	Corrections. Stars.	Apparent Correction to Harvard.
1889 July 26	1210	...	1−2·0 7+2·0	3+0·2	4+0·5	5+0·1	6+2·0	7·6	+·2	−·1	...
Aug. 6	1221	...	1−0·7	4+1·5	5+2·0	6+2·7	7+3·0	6·4	+·2	−·1	...
Aug. 17	1232	...	1−0·5 7+3·0	3+1·5	4+2·0	5+2·5	6+3·0	6·3	+·2	−·1	...
Aug. 24	1239	...	1−0·5 7+3·0	3+2·0	4+2·0	5+2·5	6+3·0	6·1	+·2	−·1	...
Sept. 3	1249	...	1−0·7 7+3·0	3+1·7	4+1·5	5+2·0	6+3·0	6·3	+·2	−·1	...
Sept. 16	1262	...	1−1·0	3+0·5	4+1·6	5+1·3	...	7·1	+·1	−·2	...
Sept. 30	1276	...	3−0·5	=4	=5	6+0·5	7+0·5	8·5	+·1	−·1	...
Oct. 9	1285	...	4−1·0	5−0·3	6+0·3	7+0·7	11+2·0	8·6	+·1	0	...
Oct. 22	1298	...	5−1·5 21+1·0	6−0·6	10+1·0	11+0·5	15+1·0	9·3	+·1	0	...
Nov. 8	1315	...	5−1·5	6−1·5	9+0·2	11+0·5	21+0·2	9·7	+·1	+·2	...
Nov. 28	1335	132	9−0·5	11−1·0	14−0·5	19−1·0	=24	11·0	−·2	+·2	...
1890 May 6	1494	...	6−1·0	=8	...	...	...	9·8	−·1	+·3	...
May 23	1511	...	4−0·7	5−1·2	6−0·5	=7	11+1·5	9·1	−·1	0	...
June 14	1533	...	1−2·0	3+0·3	4−0·2	5+0·5	7+1·3	8·0	+·1	−·1	...
June 24	1543	...	1−1·5 7+1·3	=3	4+0·5	5+1·0	6+1·3	7·7	+·2	−·1	...
July 3	1552	...	1−1·0	3+0·5	4+1·0	5+1·5	7+1·8	7·2	+·2	−·1	...
July 11	1560	...	1−1·0 7+2·0	3+1·3	4+1·3	5+1·3	6+2·0	6·9	+·2	−·1	...
July 21	1570	...	1−1·5 7+1·5	=3	4+0·5	5+0·5	6+1·5	7·7	+·2	−·1	...
Aug. 5	1585	...	1−1·5	4−0·5	5+0·2	6+0·6	7+1·0	8·1	+·1	−·1	...
Aug. 16	1596	...	5−1·0	6−0·2	9+1·0	11+1·0	12+1·0	8·9	+·1	+·2	...
Sept. 1	1612	...	6−1·0	7−1·0	9+0·2	11+0·5	=21	9·7	0	+·2	...
Sept. 9	1620	...	9−0·3	=10	=11	14+1·0	25+0·8	9·9	+·1	+·3	...
Oct. 8	1649	80	8−1·5	24−0·2	27+0·5	28+0·2	29−0·5	11·8	0	+·1	...
Oct. 19	1660	132	19−1·5	26+0·2	=27	28−0·3	29−0·3	12·3	−·1	0	...
1891 May 12	1865	...	1−0·6	3+1·3	4+1·5	5+1·5	7+2·0	6·9	+·2	−·1	...
May 26	1879	...	1−1·5	3+1·0	4+1·5	6+1·8	7+1·8	7·2	+·2	−·1	...
June 2	1886	...	1−1·0	3+0·5	4+1·0	5+1·4	7+1·8	7·3	+·2	−·1	...
June 20	1904	...	3−0·5	4−0·3	5+0·2	6+1·0	7+1·0	8·3	+·1	−·1	...
July 3	1917	...	4−1·3	5−0·8	=6	7−0·5	8+1·3	9·1	−·1	+·1	...
July 15	1929	...	6−0·7	7−1·0	8+0·7	9+0·2	11+0·7	9·5	+·1	+·3	...
Aug. 6	1951	...	9−1·0	11−1·0	=18	19−0·5	24+0·7	10·8	−·1	+·3	...
Aug. 19	1964	...	8−1·0	9−1·2	18−0·6	24+0·5	=25	11·0	−·1	+·4	...
Sept. 4	1980	80	17−1·5	18−1·0	19−1·0	24−0·5	25−0·5	11·7	−·2	+·2	...
Nov. 25	2062	132	8−1·6	19−1·3	24−0·5	29+0·5	...	11·6	−·1	+·2	...
Dec. 2	2069	80	8−0·7	9−0·7	19+0·5	24+0·5	...	10·4	0	+·3	...
1892 Apr. 14	2203	...	4−1·0	=5	6+0·5	7+0·7	11+2·0	8·5	+·1	0	...
Apr. 23	2212	...	4−1·0	=5	6−0·7	7+0·3	11+2·0	8·8	0	0	...
May 17	2236	...	6−0·7	7−0·7	8+1·0	9+0·7	11+1·0	9·2	+·1	+·3	...
June 3	2253	...	8−1·0	9−1·0	11−0·7	17+0·3	19+0·3	10·5	0	+·4	...

1891 Sept. 27. Just visible 132 in clear sky.

1891 Oct. 14, 28. Nebulosity in place of variable.

S Herculis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1892 June 23	2273	...	8−2·0	11−1·3	19−1·0	=24	25−0·7	11·5	−·2	+·3	...
July 20	2300	...	8−2·0	19−2·0	29−1·0	...	...	12·5	−·2	+·2	...
Aug. 24	2335	132	18−2·5	19−3·0	24−1·0	25−2·0	29−1·0	12·9	−·2	+·2	...
Sept. 8	2350	80	8−2·0	17−1·5	18−1·0	=24	=25	11·5	−·2	+·4	...
Sept. 24	2366	...	8−1·0	17−0·7	19−0·7	24+0·5	=25	11·0	−·1	+·4	...
Oct. 10	2382	...	8−0·2	9−1·2	17−0·2	=18	19+0·2	10·5	−·1	+·3	...
Oct. 15	2387	...	=8	9−0·5	=11	19+0·5	...	10·0	0	+·3	...
Oct. 23	2395	...	6−2·0	8+0·3	=9	=11	19+1·0	9·9	+·1	+·3	...
Nov. 3	2406	...	6−2·0	7−1·5	8+0·6	=9	11−0·3	10·0	−·1	+·3	...
Nov. 19	2422	...	6−0·5	7−1·0	8+1·3	9+1·3	11+1·3	9·0	+·1	+·3	...
Nov. 26	2429	...	4−1·3	5−1·0	=6	8+2·0	11+2·0	8·7	0	+·1	...
Dec. 9	2442	...	1−2·5	4−0·8	=5	6+1·0	7+1·0	8·4	0	−·1	...
1893 Apr. 4	2558	...	7−2·0	8+0·7	=9	=11	=19	10·1	0	+·3	...
Apr. 11	2565	...	8+0·2	9−1·0	11−1·0	=17	19−0·3	10·5	0	+·3	...
May 4	2588	80	8−1·3	11−2·0	18−1·0	19−1·5	=24	11·7	−·1	+·3	...
May 13	2597	80	8−2·0	19−1·5	24−0·5	25−0·5	=29	12·0	−·1	+·3	...
June 2	2617	132	19−2·5	24−1·5	28−1·5	29−1·0	...	13·1	−·1	0	...
June 11	2626	132	8−3·5	17−2·5	18−2·5	24−2·0	25−2·0	13·1	−·1	+·4	...
June 30	2645	132	8−3·0	9−3·0	18−2·0	24−1·5	25−1·0	12·6	−·1	+·4	...
July 25	2670	80	8−2·0	11−2·0	19−2·0	=24	...	11·8	−·1	+·3	...
Aug. 8	2684	...	8−1·0	9−1·3	=11	17+1·0	19−0·5	10·5	0	+·3	...
Aug. 17	2693	...	5−1·3	7−0·5	8+1·0	9+0·2	11+1·0	9·7	0	+·3	...
Aug. 23	2699	...	6−0·8	7−1·0	8+1·3	9+1·0	11+1·0	9·2	0	+·3	...
Sept. 2	2709	...	6−1·0	7−0·6	8+1·0	9+0·7	11+1·0	9·3	0	+·3	..
Sept. 12	2719	...	4−1·5	5−1·0	7−0·5	8+1·0	11+1·0	9·3	0	+·1	...
Oct. 1	2738	...	3−1·0	4−0·5	5−1·0	=6	7+0·6	8·9	−·1	−·1	...
Oct. 7	2744	...	3−1·0	4−0·3	5−0·5	6+0·4	7+0·4	8·7	0	−·1	...
Oct. 19	2756	...	1−1·3	4−0·2	5−0·2	6+1·0	7+1·0	8·0	0	−·1	...
Oct. 31	2768	...	1−1·2	3+0·6	4+0·6	5+1·0	6+1·2	7·5	+·1	−·1	...
Nov. 7	2775	...	1−1·0	3+1·0	4+1·0	5+1·3	7+2·0	7·1	+·1	−·1	...
Nov. 20	2788	...	1−1·0	3+1·0	4+1·0	6+1·3	7+1·3	7·4	+·1	−·1	...
Nov. 26	2794	...	1−1·3	3+1·2	4+1·2	6+1·5	7+1·5	7·3	+·1	−·1	...
Dec. 3	2801	...	1−2·0	2−0·5	=5	...	...	8·3	−·1	0	...
Dec. 9	2807	...	1−1·5	2−1·0	3+0·7	5+1·3	6+1·6	7·7	0	−·1	...
1894 May 26	2975	80	8−1·5	9−2·0	18−1·0	24−0·3	25−0·3	11·5	−·1	+·4	...
June 13	2993	...	5−1·7	7−1·3	=8	9−0·5	11+0·7	10·0	0	+·3	...
June 20	3000	...	6−1·0	7−1·0	8+0·4	9−0·3	11+1·0	9·7	0	+·3	...
June 27	3007	...	5−1·3	6−1·0	7−1·0	8+0·6	9+0·7	9·5	0	+·2	...
July 4	3014	...	5−1·3	7−0·3	8+0·7	9+0·7	11+1·0	9·6	0	+·3	...
July 21	3031	...	5−1·0	6−0·5	7−0·5	8+1·0	11+1·0	9·2	0	+·2	...
July 27	3037	...	5−1·0	6−0·5	7−0·5	8+1·2	11+1·2	9·1	0	+·2	...
Aug. 20	3061	...	1−1·3	5−0·5	6+0·5	7+0·7	8+0·7	8·5	0	+·1	...

1892 July 28. A minute star 13·5 mag. (numbered 31) seen for the first time between variable and No. 8. No star seen here during last six years. The variable just seen 132; so on Aug. 15.
1894 April 25. Not seen 34, 80, 132 in clear sky; so on 1896 Nov. 9, 28.
1894 May 10. Just seen 132; so on 1896 Oct. 31; 1897 Sept. 30.

S Herculis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1894 Aug. 31	3072	...	4+0·2	5+0·5	6+1·0	8+2·0	11+2·0	7·9	+·2	+·1	...
Sept. 8	3080	...	1−1·2	4+1·0	6+1·3	7+1·3	8+2·0	7·5	+·1	+·1	...
Sept. 26	3098	...	1−1·0	4+1·0	5+1·3	7+1·6	8+2·5	7·2	+·1	+·1	...
Oct. 2	3104	...	1−1·2	4+1·0	5+1·0	6+1·3	7+1·5	7·4	+·1	−·1	...
Oct. 22	3124	...	1−1·3	4−0·3	=5	6+1·0	7+1·0	8·0	0	−·1	...
Nov. 5	3138	...	=4	5+0·3	6+1·0	7+1·0	11+2·0	8·0	+·2	0	...
Nov. 15	3148	...	4−1·0	5−0·5	6+0·8	7+0·5	8+2·0	8·4	0	+·1	...
1895 Apr. 10	3294	80	8−1·0	11−1·0	...	...	...	10·9	−·1	+·4	...
May 1	3315	...	7−1·5	=8	=9	=11	19+0·8	9·9	0	+·3	...
May 9	3323	...	5−1·5	7−1·0	8+0·3	9+0·3	11+0·3	9·7	0	+·3	...
May 22	3336	...	5−1·2	6−0·6	7−0·6	8+0·8	11+0·8	9·4	0	+·2	...
June 5	3350	...	5−1·2	6−0·8	7−0·6	8+0·6	11+1·0	9·4	0	+·2	...
June 23	3368	...	5−1·2	6−0·2	7−0·6	8+1·0	9+1·0	9·1	0	+·2	...
July 7	3382	...	1−1·4	4−0·2	5+0·2	6+0·5	7+1·0	8·1	0	−·1	...
July 28	3403	...	1−1·0	4+1·0	5+1·0	6+1·3	7+1·3	7·4	+·1	−·1	...
Aug. 15	3421	...	1−1·2	4+1·0	5+1·0	6+1·3	7−1·3	7·9	+·1	−·1	...
Aug. 24	3430	...	1−1·0	4+0·6	5+1·0	6+0·6	7+1·0	7·7	+·1	−·1	...
Sept. 4	3441	...	1−1·3	=4	=5	6+0·6	7+0·5	8·1	0	−·1	...
Sept. 13	3450	...	4 -0·5	5+0·3	6+0·3	7+0·6	8+1·3	8·4	+·1	+·1	...
Sept. 25	3462	...	5−1·3	6−0·3	=7	8+1·3	11+1·0	9·1	0	+·2	...
Oct. 16	3483	...	5−1·3	6−1·0	8+0·3	=9	11+0·3	9·6	0	+·3	...
Oct. 26	3493	...	6−1·0	7−1·3	8−0·3	9−1·0	=11	10·2	−·1	+·3	...
Nov. 9	3507	...	8−2·0	9−1·3	11−1·0	19−1·0	24+0·3	11·3	−·1	+·3	...
Nov. 17	3515	80	8−1·3	9−2·0	11−1·3	18−1·0	24−0·3	11·5	−·1	+·2	...
1896 Apr. 8	3658	...	8+1·3	...	...	...	...	11·1	+·1	+ 6	...
Apr. 17	3667	...	4−1·3	5−1·0	6−0·5	7+0·3	8+1·0	9·1	0	+·1	...
Apr. 26	3676	...	4−1·0	5−0·4	6+0·3	7+0·3	8+1·5	8·7	0	+·1	...
May 8	3688	...	1−1·3	=4	5+0·5	6+1·0	7+1·0	7·9	+·1	−·1	...
May 21	3701	...	1−1·3	4−0·5	5+0·8	6+1·0	7+1·0	7·9	0	−·1	...
June 11	3722	...	1−1·2	4+0·6	5+1·0	6+1·2	7+1·2	7·5	+·1	−·1	...
June 24	3735	...	1−1·0	4+0·3	5+0·6	6+1·0	8+1·7	7·8	+·1	+·1	...
July 5	3746	...	4−1·0	5+0·3	6+1·0	7+1·0	8+1·7	8·2	+·1	+·1	...
July 18	3759	...	1−2·0	4−0·6	5−0·2	6+0·5	7+0·2	8·5	0	−·1	...
Aug. 3	3775	...	5−1·0	6−0·3	7−0·3	8+1·3	11+1·1	9·0	0	+·2	...
Aug. 13	3785	...	5−1·0	6−0·7	8+0·8	9+0·8	11+0·8	9·2	0	+·3	...
Sept. 2	3805	...	5−1·5	7−1·0	8+0·2	9−0·2	=11	9·9	−·1	+·3	...
Sept. 16	3819	...	8−1·0	9−1·0	11−1·3	...	...	10·9	−·1	+·5	...
Sept. 26	3829	...	8−1·3	9−1·3	11−1·5	19−1·0	=24	11·3	−·1	+·3	...
Oct. 9	3842	80	8−2·0	9−2·0	11−2·0	18−1·0	19−1·0	11·7	−·1	+·4	...
1897 Apr. 22	4037	...	1−1·3	4−0·3	5+0·2	6+0·8	7+0·8	8·1	0	−·1	...
May 1	4046	...	4−0·3	=5	6+0·5	7+1·0	8+2·0	8·2	+·1	+·1	...
May 18	4063	...	4−1·0	5−0·3	6+1·0	7+0·3	8+2·0	8·4	0	+·1	...
June 4	4080	...	4−1·0	5−0·6	=6	=7	8+1·3	8·9	0	+·1	...
June 11	4087	...	4−1·6	5−1·2	6−0·2	=7	8+1·2	9·1	−·1	+·1	...
July 11	4117	...	5−1·3	6−1·0	8−0·3	9−0·3	=11	9·9	−·2	+·3	...
July 26	4132	...	5−2·0	6−2·0	8−0·5	9−1·0	11−0·5	10·5	−·1	+·3	...

S HERCULIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1897 Aug. 11	4148	...	7−3·0	8−2·0	9−2·0	11−1·3	19−1·3	11·7	−·1	+·3	...
Sept. 3	4171	132	8−2·3	9−2·3	11−2·5	17−1·0	19−1·5	12·0	−·1	+·4	...
Sept. 18	4186	132	8−3·0	9−3·0	19−2·0	29−1·0	...	12·8	−·1	+·2	...
Oct. 12	4210	80	8−2·0	9−1·5	11−2·0	19−1·0	24−1·0	11·8	−·1	+·3	...
Oct. 20	4218	80	8−2·0	9−2·0	11−2·0	19−1·5	=24	11·8	−·1	+·3	...
Nov. 1	4230	...	5−2·0	7−1·0	8+0·5	=9	11+0·5	9·8	0	+·3	...
Nov. 19	4248	...	5−1·0	8+2·0	9+1·0	11+1·0	...	8·6	+·1	+·3	...
Nov. 29	4258	...	5−1·3	6−0·3	8+1·5	9+1·0	11+1·5	8·8	0	+·3	...
1898 Apr. 8	4388	...	4−2·0	5−1·0	6−0·7	=7	11+1·0	9·4	−·1	0	...
Apr. 22	4402	...	5−1·3	6−1·0	7−1·0	8+1·0	=11	9·7	−·1	+·2	...
May 4	4414	...	5−1·0	6−1·0	7−0·5	8+0·5	11+1·0	9·4	−·1	+·2	...
June 7	4448	80	5−2·0	6−2·0	8−1·0	11−1·0	...	10·7	−·2	+·2	...
June 22	4463	...	5−3·0	7−2·0	8−1·7	11−1·0	19−1·0	11·2	−·2	+·2	...
July 11	4482	...	6−3·0	8−1·5	9−1·0	11−1·3	19−1·0	11·4	−·2	+·3	...
July 28	4499	...	5−2·3	8−1·0	9−1·3	11−0·6	19−0·5	10·8	−·2	+·3	...
Aug. 13	4515	...	5−1·5	6−1·0	=8	=9	=11	9·9	−·1	+·3	...
Aug. 25	4527	...	6−1·2	7−1·0	8+1·2	9+1·0	11+1·0	9·3	+·1	+·3	...
Sept. 12	4545	...	5−1·0	6−0·3	8+2·0	9+1·0	11+0·7	8·7	+·1	+·3	...
Sept. 20	4553	...	5−1·0	6+0·3	7+0·3	8+2·0	9+1·0	8·6	+·2	+·2	...
Oct. 1	4564	...	1−1·5	5+0·3	6+0·8	7+1·0	8+1·5	8·1	+·2	+·1	...
Oct. 12	4575	...	4−1·0	5+0·2	6+1·0	7+1·0	8+2·0	8·0	+·2	+·1	...
Oct. 19	4582	...	4−0·5	5−0·7	6+0·5	7+1·0	8+1·3	8·5	+·1	+·1	...
Oct. 30	4593	...	5+0·8	6+1·2	7+1·0	8+2·0	11+2·0	7·8	+·3	+·2	...
Nov. 9	4603	...	4+1·0	5+1·0	6+1·4	7+1·7	8+2·5	7·3	+·3	+·1	...
Nov. 18	4612	...	1−1·3	5+1·3	6+2·0	7+1·0	8+3·0	7·3	+·2	+·1	...
Dec. 7	4631	...	1−1·3	4+1·5	5+1·7	6+1·7	7+2·5	6·9	+·2	−·1	...
1899 Apr. 19	4764	80	7−2·7	8−1·3	9−2·0	11−2·0	19−1·0	11·6	−·2	+·3	...
May 2	4777	...	8−1·0	9−1·3	11−0·5	17+0·2	19−1·3	10·9	−·1	+·4	...
May 28	4803	...	7−1·5	8−1·0	9−1·0	11−1·0	19−0·2	10·7	−·2	+·3	...
June 6	4812	...	4−2·0	5−2·0	7−1·0	8−0·3	=11	10·2	−·2	+·1	...
June 14	4820	...	5−2·0	6−2·0	8−0·5	9−1·0	11−0·5	10·5	−·2	+·3	...
July 4	4840	...	6−1·3	7−1·3	8+0·7	9+0·4	11+0·7	9·7	+·1	+·3	...
July 16	4852	...	5−1·5	6−1·0	7−1·0	8+1·5	9+1·0	9·3	−·1	+·2	...
July 28	4864	...	5−1·7	6−1·0	7−0·3	8+1·5	11+1·0	9·3	−·1	+·2	...
Aug. 8	4875	...	5−1·5	=6	=7	8+2·0	11+1·5	8·8	+·1	+·2	...
Aug. 12	4879	...	5−1·7	6−1·0	8+2·0	9+1·7	11+2·0	8·7	+·1	+·3	...
Aug. 18	4885	...	5−1·5	6−0·5	7+0·3	8+2·0	9+1·5	8·7	+·1	+·2	...
Aug. 23	4890	...	5−1·0	6−0·2	7+0·6	8+1·8	11+2·0	8·6	+·1	+·2	...
Sept. 3	4901	...	=4	5+0·5	6+1·0	7+1·0	8+2·3	7·8	+·2	+·1	...
Sept. 16	4914	...	4+1·5	5+2·0	6+2·5	7+2·5	8+3·5	6·6	+·3	+·1	...
Sept. 26	4924	...	1−1·0	4+2·0	5+2·0	6+2·5	7+3·0	6·4	+·2	−·1	...
Oct. 2	4930	...	1−0·7	2+0·3	4+2·0	5+2·0	6+2·5	6·7	+·2	−·1	...
Oct. 9	4937	...	1−1·0	4+1·5	5+1·5	6+2·0	7+2·0	6·9	+·2	−·1	...
Oct. 17	4945	...	1−1·3	4+1·5	5+1·6	6+1·6	7+2·3	7·0	+·2	−·1	...
Oct. 24	4952	...	1−2·0	3+1·0	4+1·5	5+1·5	6+2·0	7·1	+·2	−·1	...
Oct. 30	4958	...	1−1·7	3+1·0	4+1·3	5+1·5	6+2·0	7·1	+·2	−·1	...

S Herculis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1899 Nov. 6	4965	...	1−2·5	3−1·0	4+0·7	5+0·3	6+1·3	8·1	+·1	−·1	...
Nov. 17	4976	...	4−1·0	5−1·0	6+1·0	7+1·0	8+2·0	8·4	+·1	+·1	...
Nov. 26	4985	...	4−1·5	5−1·3	6−1·0	7−0·5	11+1·3	9·5	−·2	0	...
											G.M.T. h m
1900 Apr. 9	5119	...	5−2·0	6−1·7	7−1·0	9−0·2	=11	10·2	−·2	+·2	10 0
Apr. 18	5128	...	8−1·0	9−1·3	11−1·3	19−1·3	...	11·2	−·2	+·4	9 50
Apr. 26	5136	...	8−1·2	9−1·5	11−1·0	19−1·2	24+0·3	11·2	−·1	+·3	9 50
May 25	5165	...	5−2·5	6−1·5	8+0·5	=9	11+1·0	9·8	0	+·3	9 50
June 9	5180	...	5−1·2	6−0·5	7−0·6	8+1·2	11+1·5	9·1	−·1	+·2	9 0
June 17	5188	...	5−1·0	7+0·5	8+1·5	9+1·3	11+2·0	8·5	+·2	+·3	10 10
June 26	5197	...	5−1·0	6+1·0	7+1·0	8+2·0	9+1·8	8·1	+·2	+·2	10 0
July 3	5204	...	4−1·2	5−0·2	6+1·0	7+0·7	8+2·0	8·3	+·1	+·1	9 30
July 10	5211	...	4+0·7	5+1·5	6+1·0	7+1·5	8+2·7	7·3	+·3	+·1	11 0
July 17	5218	...	1−1·5	4+1·0	5+1·3	6+1·6	7+1·8	7·3	+·2	−·1	9 50
July 23	5224	...	1−1·3	4+1·0	5+1·5	6+2·0	7+2·0	7·1	+·2	−·1	10 10
Aug. 9	5241	...	1−0·6	4+1·5	5+2·0	6+3·0	7+3·0	6·3	+·2	−·1	9 20
Aug. 15	5247	...	1−1·3	4+1·5	5+1·7	6+2·5	7+2·0	6·8	+·2	−·1	9 30
Aug. 23	5255	...	1−1·3	3+1·0	4+1·5	5+1·7	6+2·0	6·9	+·2	−·1	9 20
Aug. 30	5262	...	1−1·3	3+0·3	4+1·5	5+1·5	6+2·0	7·1	+·2	−·1	8 30
Sept. 6	5269	...	1−1·5	3+1·0	4+1·5	5+1·7	7+2·0	7·1	+·2	−·1	10 20
Sept. 13	5276	...	=3	4+0·5	5+1·3	6+2·0	7+1·7	7·4	+·2	−·1	8 50
Sept. 23	5286	...	4−0·5	5+0·3	6+0·5	7+1·0	8+1·5	8·2	+·2	+·1	7 50
Oct. 6	5299	...	4−1·3	5−0·7	6−0·5	=7	8+1·5	9·0	−·1	+·1	7 30
Oct. 21	5314	...	5−1·5	6−0·8	7−1·0	8+0·7	11+1·0	9·5	−·1	+·2	7 20
Nov. 2	5326	...	5−1·3	6−0·8	8+0·3	9−0·2	11+0·5	9·7	0	+·3	7 20
Nov. 13	5337	80	5−2·5	6−2·0	8−1·0	9−1·3	11−1·3	11·0	−·2	+·3	7 0

T Draconis.

R. A. $17^h\ 54^m\ 52^s$. Dec. $+58°\ 13'{\cdot}7$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1895 Apr. 15	3299	...	$a-2{\cdot}0$	$b-0{\cdot}7$	$c+0{\cdot}5$	$d+1{\cdot}3$	$e+1{\cdot}8$	9·1	0	0	...
May 2	3316	...	$a-2{\cdot}0$	$b-1{\cdot}0$	$=c$	$d+1{\cdot}0$	$e+1{\cdot}3$	9·4	0	0	...
May 14	3328	...	$a-2{\cdot}0$	$b-1{\cdot}0$	$c-0{\cdot}3$	$d+1{\cdot}0$	$e+1{\cdot}3$	9·5	0	0	...
May 27	3341	...	$a-2{\cdot}2$	$c-1{\cdot}0$	$d+0{\cdot}8$	$e+1{\cdot}3$	$f+2{\cdot}0$	9·5	0	+·1	...
June 6	3351	...	$a-2{\cdot}0$	$b-1{\cdot}0$	$c-1{\cdot}0$	$d+0{\cdot}5$	$e+1{\cdot}0$	9·8	0	0	...
June 27	3372	...	$a-2{\cdot}0$	$b-1{\cdot}5$	$c-1{\cdot}2$	$=d$	$e+1{\cdot}2$	10·0	0	0	...
July 12	3387	...	$c-1{\cdot}2$	$d+0{\cdot}5$	$e+1{\cdot}2$	$f+1{\cdot}0$	$g+1{\cdot}5$	9·8	+·1	0	...
Aug. 15	3421	...	$c-1{\cdot}3$	$d-0{\cdot}3$	$e+0{\cdot}6$	$f+0{\cdot}6$	$g+1{\cdot}0$	10·3	0	0	...
Aug. 27	3433	...	$a-1{\cdot}6$	$c-1{\cdot}0$	$=d$	$e+1{\cdot}0$	$f+1{\cdot}0$	9·8	0	+·1	...
Sept. 13	3450	...	$a-2{\cdot}3$	$c-1{\cdot}0$	$=d$	$e+1{\cdot}0$	$f+1{\cdot}0$	10·0	0	+·1	...
Sept. 28	3465	...	$a-2{\cdot}0$	$c-1{\cdot}3$	$d+0{\cdot}3$	$e+1{\cdot}2$	$f+1{\cdot}0$	9·9	0	+·1	...
Oct. 16	3483	...	$c-1{\cdot}0$	$=d$	$e+1{\cdot}3$	$f+1{\cdot}3$	$g+2{\cdot}0$	9·7	+·1	0	...
Oct. 26	3493	...	$a-2{\cdot}5$	$c-1{\cdot}0$	$d+0{\cdot}3$	$e+1{\cdot}5$	$f+1{\cdot}5$	9·7	0	+·1	...
Nov. 13	3511	...	$a-1{\cdot}5$	$b-0{\cdot}7$	$c-1{\cdot}0$	$=d$	$e+1{\cdot}0$	9·7	−·1	0	...
Nov. 30	3528	...	$a-1{\cdot}3$	$b-0{\cdot}5$	$c-0{\cdot}3$	$d+0{\cdot}5$	$e+1{\cdot}5$	9·3	0	0	...
Dec. 16	3544	...	$a-1{\cdot}0$	$b+0{\cdot}3$	$c+1{\cdot}0$	$d+1{\cdot}7$	$e+2{\cdot}0$	8·5	+·1	0	...
Dec. 31	3559	...	$a-0{\cdot}5$	$b+1{\cdot}0$	$c+1{\cdot}5$	$d+2{\cdot}0$	...	7·9	+·1	+·1	...
1896 Jan. 9	3568	...	$a-0{\cdot}5$	$b+1{\cdot}0$	$c+1{\cdot}3$	$d+2{\cdot}0$	...	7·9	+·1	+·1	...
Jan. 22	3581	...	$a-0{\cdot}5$	$b+1{\cdot}0$	$c+1{\cdot}4$	$d+2{\cdot}0$	$e+2{\cdot}5$	8·0	+·1	0	...
Feb. 4	3594	...	$a-0{\cdot}7$	$b+0{\cdot}3$	$c+1{\cdot}0$	$d+1{\cdot}5$	...	8·4	+·1	+·1	...
Feb. 22	3612	...	$a+0{\cdot}5$	$b+1{\cdot}0$	$c+1{\cdot}3$	$d+2{\cdot}0$	...	7·7	+·2	+·1	...
Mar. 14	3633	...	$a-1{\cdot}0$	$b+0{\cdot}5$	$c+1{\cdot}0$	$d+2{\cdot}0$	...	8·3	+·1	+·1	...
Mar. 27	3646	...	$a-0{\cdot}5$	$b+1{\cdot}0$	$c+1{\cdot}0$	$d+2{\cdot}0$	$e+2{\cdot}5$	8·1	+·1	0	...
Apr. 12	3662	...	$a-1{\cdot}3$	$b+0{\cdot}8$	$c+1{\cdot}0$	$d+1{\cdot}5$	$e+2{\cdot}0$	8·5	+·1	0	...
Apr. 21	3671	...	$a-1{\cdot}0$	$b+0{\cdot}6$	$c+1{\cdot}0$	$d+1{\cdot}6$	$g+3{\cdot}0$	8·4	+·1	0	...
May 9	3689	...	$a-1{\cdot}3$	$b+0{\cdot}5$	$c+0{\cdot}7$	$d+1{\cdot}2$	$e+1{\cdot}5$	8·8	+·1	0	...
May 21	3701	...	$a-1{\cdot}0$	$b+0{\cdot}6$	$c+0{\cdot}8$	$d+1{\cdot}5$	...	8·4	+·1	+·1	...
June 19	3730	...	$a-1{\cdot}3$	$c+0{\cdot}3$	$d+1{\cdot}2$	$e+1{\cdot}5$	$g+2{\cdot}0$	9·2	+·1	−·1	...
July 7	3748	...	$a-1{\cdot}5$	$b-1{\cdot}2$	$=c$	$d+1{\cdot}0$	$e+1{\cdot}3$	9·4	0	0	...
July 30	3771	...	$a-1{\cdot}5$	$b-1{\cdot}0$	$c-0{\cdot}7$	$d+0{\cdot}5$	$f+1{\cdot}2$	9·4	0	+·1	...
Aug. 13	3785	...	$a-1{\cdot}5$	$c-1{\cdot}3$	$d-0{\cdot}5$	$e+1{\cdot}0$	$f+1{\cdot}0$	10·0	0	+·1	...
Aug. 26	3798	...	$a-2{\cdot}0$	$b-0{\cdot}5$	$c-1{\cdot}0$	$d+0{\cdot}5$	$e+1{\cdot}0$	9·7	0	0	...
Sept. 15	3818	...	$a-2{\cdot}0$	$b-1{\cdot}2$	$c-1{\cdot}0$	$d+0{\cdot}2$	$e+1{\cdot}0$	9·9	0	0	...
Sept. 26	3829	...	$a-1{\cdot}7$	$b-1{\cdot}2$	$c-0{\cdot}7$	$=d$	$e+1{\cdot}0$	9·8	−·1	0	...
Oct. 18	3851	...	$a-1{\cdot}5$	$b-1{\cdot}3$	$c-1{\cdot}0$	$d-0{\cdot}3$	$e+1{\cdot}0$	9·9	−·1	0	...
Oct. 31	3864	...	$a-1{\cdot}7$	$b-1{\cdot}2$	$c-1{\cdot}0$	$d+0{\cdot}2$	$e+1{\cdot}3$	9·8	0	0	...
Nov. 9	3873	...	$a-1{\cdot}7$	$b-1{\cdot}4$	$c-1{\cdot}2$	$d-0{\cdot}3$	$e+1{\cdot}0$	10·0	−·1	0	...
Nov. 28	3892	...	$a-1{\cdot}5$	$b-0{\cdot}5$	$c-0{\cdot}5$	$d+0{\cdot}5$	$e+1{\cdot}3$	9·4	0	0	...
Dec. 9	3903	...	$a-1{\cdot}4$	$b-1{\cdot}0$	$c-0{\cdot}5$	$d+0{\cdot}5$	$e+1{\cdot}0$	9·6	0	0	...
Dec. 23	3917	...	$a-1{\cdot}5$	$b-0{\cdot}5$	$c-0{\cdot}2$	$d+1{\cdot}0$	$e+1{\cdot}3$	9·3	0	0	...
1897 Jan. 17	3942	...	$a-1{\cdot}0$	$b-0{\cdot}3$	$c-0{\cdot}2$	$d+1{\cdot}0$	$e+1{\cdot}5$	9·1	0	0	...
Feb. 7	3963	...	$a-1{\cdot}3$	$b-0{\cdot}3$	$c+0{\cdot}7$	$d+1{\cdot}3$	$e+2{\cdot}5$	8·7	0	0	...

T Draconis—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1897 Feb. 17	3973	...	$a-0.6$	$b+0.7$	$c+1.2$	$d+1.7$	$e+2.0$	8·3	+·1	0	...
Mar. 19	4003	...	$a-0.4$	$b+1.3$	$c+1.6$	$d+2.0$	...	7·8	+·1	+·1	...
Apr. 7	4022	...	$a+0.5$	$b+1.3$	$c+1.6$	$d+2.2$	...	7·5	+·2	+·1	...
Apr. 23	4038	...	$a-1.0$	$b+1.0$	$c+1.7$	$d+2.3$	$f+2.5$	7·9	+·1	+·1	...
May 5	4050	...	$a-0.7$	$b+1.0$	$c+1.2$	$d+2.0$	$e+3.0$	8·0	+·1	0	...
May 18	4063	...	$a-1.0$	$b+1.0$	$c+1.0$	$d+2.0$	$e+2.0$	8·3	+·1	0	...
June 4	4080	...	$a-1.0$	$b+0.5$	$c+0.8$	$d+1.2$	$e+1.5$	8·7	+·1	0	...
June 20	4096	...	$a-1.0$	$b+0.5$	$c+1.0$	$d+1.7$	$e+2.0$	8·5	+·1	0	...
July 15	4121	...	$a-1.0$	$b+0.3$	$c+1.0$	$d+2.0$	$e+2.0$	8·4	+·1	0	...
Aug. 12	4149	...	$a-1.3$	$=b$	$c+0.7$	$d+2.0$	$e+1.3$	8·8	+·1	0	...
Sept. 18	4186	...	$a-1.5$	$b-0.5$	$c-0.3$	$d+0.7$	$e+1.3$	9·4	0	0	...
Oct. 1	4199	...	$a-2.5$	$b-1.3$	$c-1.0$	$d+1.0$	$e+1.3$	9·8	0	0	...
Oct. 26	4224	...	$b-2.0$	$c-1.0$	$=d$	$f+1.0$	$g+1.5$	10·0	0	+·1	...
Nov. 15	4244	...	$a-3.5$	$b-2.0$	$c-1.3$	$d-0.5$	$e+1.0$	10·6	−·1	0	...
Dec. 3	4262	...	$a-2.5$	$b-1.3$	$c-1.5$	$d-0.3$	$e+1.0$	10·2	−·1	0	...
Dec. 20	4279	...	$a-3.5$	$b-2.0$	$c-1.3$	$=d$	$e+1.2$	10·4	0	0	...
1898 Jan. 3	4293	...	$a-2.5$	$b-1.5$	$c-1.3$	$=d$	$e+0.7$	10·2	−·1	0	...
Feb. 6	4327	...	$a-2.3$	$b-1.3$	$c-0.8$	$d+1.0$	$e+1.5$	9·7	−·1	0	...
Feb. 26	4347	...	$a-3.0$	$b-2.0$	$c-1.6$	$=d$	$e+1.2$	10·4	−·1	0	...
Mar. 21	4370	...	$a-2.5$	$b-1.8$	$c-1.0$	$=d$	$e+1.0$	10·2	−·1	0	...
Apr. 12	4392	...	$a-1.5$	$=b$	$c+1.0$	$d+2.0$	$e+2.5$	8·5	+·1	0	...
Apr. 29	4409	...	$a-1.0$	$b+1.0$	$c+1.5$	$d+2.0$	...	8·0	+·1	+·1	...
May 12	4422	...	$a-1.3$	$b+1.0$	$c+1.6$	$d+2.0$	$f+2.0$	8·1	+·2	+·1	...
June 22	4463	...	$a-1.3$	$b+1.0$	$c+1.3$	$d+2.0$	...	8·1	+·1	+·1	...
July 2	4473	...	$a-0.5$	$b+1.0$	$c+1.3$	$d+2.0$	$f+2.5$	7·9	+·2	+·1	...
July 14	4485	...	$a-1.3$	$b+0.7$	$c+1.0$	$d+2.0$	$e+2.0$	8·4	+·2	0	...
Aug. 16	4518	...	$a-1.3$	$b+1.0$	$c+1.3$	$d+2.0$	$f+2.0$	8·2	+·2	+·1	...
Aug. 27	4529	...	$a-1.3$	$b-0.5$	$c+1.3$	$d+2.0$	$f+2.7$	8·4	+·1	+·1	...
Sept. 16	4549	...	$a-1.5$	$b-0.5$	$c+0.5$	$d+1.5$	$f+2.3$	8·7	+·1	+·1	...
Sept. 28	4561	...	$a-1.3$	$b-0.3$	$c+1.0$	$d+1.5$	$e+1.5$	8·8	+·1	0	...
Oct. 12	4575	...	$a-1.5$	$b-0.5$	$c+0.3$	$d+1.3$	$f+2.0$	8·9	+·1	+·1	...
Nov. 3	4597	...	$a-2.0$	$b-1.0$	$c-0.5$	$d+1.0$	$e+1.3$	9·5	−·1	0	...
Dec. 9	4633	...	$c-2.3$	$d-1.3$	$e+1.0$	$f+1.0$	$g+1.0$	10·5	0	0	...
Dec. 28	4652	...	$a-2.5$	$b-1.5$	$c-1.0$	$d+0.3$	$e+1.5$	9·9	−·1	0	...
1899 Jan. 22	4677	80	$b-2.0$	$c-1.5$	$d-1.0$	$e+0.5$	$=g$	10·8	−·1	0	...
Feb. 2	4688	80	$a-2.5$	$b-2.0$	$c-1.7$	$d-1.0$	$e+0.2$	10·7	−·1	0	...
Feb. 16	4702	80	$c-2.3$	$d-1.0$	$e-0.6$	$=f$	$=g$	11·2	−·1	0	...
Feb. 28	4714	132	$c-3.0$	$d-2.0$	$e-1.5$	$f-1.0$	$g-1.0$	12·1	−·2	0	...
Mar. 10	4724	80	$c-3.0$	$d-1.5$	$e-1.0$	$f-1.0$	$=g$	11·7	−·2	0	...
Apr. 8	4753	...	$b-1.7$	$c-1.5$	$d-0.5$	$e+0.6$	$f+1.0$	10·2	0	+·1	...
May 3	4778	...	$a-2.5$	$b-1.3$	$c-1.0$	$d+1.0$	$e+1.0$	9·9	−·1	0	...
May 28	4803	...	$a-2.5$	$b-1.5$	$c-1.0$	$d+0.7$	$e+1.3$	9·9	−·1	0	...
June 8	4814	...	$a-2.3$	$b-1.3$	$c-1.0$	$d+1.0$	$e+1.2$	9·8	−·1	0	...
June 29	4835	...	$a-2.5$	$b-1.0$	$c+0.3$	$d+2.0$	$f+2.5$	8·9	+·1	+·1	...
July 14	4850	...	$a-1.0$	$b+0.5$	$c+1.3$	$d+2.0$	...	8·2	+·1	+·1	...
July 27	4863	...	$a-1.3$	$b+0.5$	$c+1.3$	$d+2.3$	$e+2.7$	8·2	+·2	0	...

T DRACONIS—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1899 Aug. 6	4873	...	$a-2\cdot0$	$b+0\cdot3$	$c+1\cdot3$	$d+2\cdot5$	$f+3\cdot0$	8·2	+·2	+·1	...
Aug. 12	4879	...	$a-2\cdot0$	$b+0\cdot5$	$c+1\cdot5$	$d+2\cdot8$	$f+3\cdot0$	8·0	+·2	+·1	...
Aug. 19	4886	...	$a-1\cdot5$	$b+0\cdot5$	$c+1\cdot5$	$d+2\cdot5$	$f+3\cdot0$	8·0	+·2	+·1	...
Sept. 2	4900	...	$a-1\cdot5$	$b-0\cdot6$	$c+0\cdot6$	$d+2\cdot0$	$f+2\cdot5$	8·6	+·1	+·1	...
Sept. 18	4916	...	$a-2\cdot0$	$b-0\cdot5$	$c+1\cdot0$	$d+2\cdot0$	$g+3\cdot0$	8·7	+·1	0	...
Sept. 27	4925	...	$a-2\cdot0$	$b-1\cdot0$	$c+0\cdot5$	$d+2\cdot0$	$f+2\cdot0$	8·9	+·1	+·1	...
Oct. 5	4933	...	$b-0\cdot7$	$c+1\cdot0$	$d+2\cdot0$	$f+2\cdot0$	$g+3\cdot0$	8·4	+·2	+·1	...
Oct. 24	4952	...	$b-1\cdot2$	$c+0\cdot5$	$d+1\cdot5$	$f+2\cdot0$	$g+3\cdot0$	8·7	+·2	+·1	...
Nov. 13	4972	...	$a-2\cdot5$	$b-1\cdot2$	$c-0\cdot2$	$d+1\cdot5$	$e+2\cdot0$	9·4	−·1	0	...
Dec. 14	5003	...	$a-2\cdot0$	$b-1\cdot3$	$c-0\cdot5$	$d+0\cdot5$	...	9·7	−·1	+·1	...
Dec. 30	5019	...	$b-1\cdot5$	$c-1\cdot0$	$=d$	$e+1\cdot0$	$f+1\cdot0$	9·9	0	+·1	...
1900 Jan. 9	5029	...	$a-2\cdot5$	$b-1\cdot3$	$c-1\cdot2$	$d-0\cdot5$	$e+1\cdot0$	10·2	−·1	0	...
Jan. 25	5045	...	$c-2\cdot0$	$d-1\cdot0$	$e-0\cdot5$	$f-0\cdot5$	$=g$	11·2	−·2	0	...
Feb. 20	5071	80	$c-2\cdot2$	$d-1\cdot0$	$e-0\cdot5$	$=f$	$g+0\cdot5$	11·0	−·1	0	G.M.T. h m
Mar. 16	5095	80	$c-2\cdot0$	$d-1\cdot0$	$=e$	$f+1\cdot0$	$g+0\cdot3$	10·7	0	0	7 40
Apr. 4	5114	...	$c-2\cdot3$	$d-1\cdot0$	$e-0\cdot5$	$=f$	$g+1\cdot0$	11·0	−·1	0	10 0
Apr. 16	5126	...	$c-2\cdot5$	$d-1\cdot0$	$e-0\cdot2$	$f-0\cdot3$	$g+0\cdot3$	11·1	−·1	0	9 40
Apr. 26	5136	...	$c-1\cdot8$	$d-0\cdot5$	$e-0\cdot5$	$=f$	$g+0\cdot5$	10·9	−·1	0	9 20
May 25	5165	...	$a-2\cdot5$	$b-1\cdot7$	$c-1\cdot5$	$d-0\cdot3$	$=e$	10 5	−·2	0	9 40
June 9	5180	...	$a-2\cdot5$	$b-1\cdot2$	$c-1\cdot5$	$=d$	$e+0\cdot6$	10·2	−·1	0	9 40
July 10	5211	...	$c-2\cdot0$	$=d$	$e+1\cdot0$	$f+1\cdot0$	$g+1\cdot5$	10·1	+·1	0	10 30
July 16	5217	...	$b-1\cdot0$	$c-1\cdot0$	$d+1\cdot0$	$e+1\cdot0$	$g+2\cdot0$	9·6	+·1	0	10 20
Aug. 12	5244	...	$b-1\cdot3$	$c-1\cdot0$	$d+1\cdot0$	$e+2\cdot0$	$g+2\cdot0$	9·5	+·1	0	9 40
Sept. 3	5266	...	$a-1\cdot3$	$b+0\cdot7$	$c+1\cdot3$	$d+2\cdot0$	$f+2\cdot5$	8·2	+·2	+·1	9 50
Sept. 11	5274	...	$a-1\cdot5$	$b+0\cdot7$	$c+1\cdot3$	$d+2\cdot0$	$f+3\cdot0$	8·1	+·2	+·1	9 50
Sept. 21	5284	...	$a-1\cdot3$	$b+1\cdot0$	$c+1\cdot5$	$d+2\cdot0$	$f+2\cdot5$	8·1	+·2	+·1	9 50
Oct. 10	5303	...	$a-0\cdot8$	$b+1\cdot0$	$c+2\cdot0$	$d+3\cdot0$	$g+3\cdot5$	7·7	+·2	0	9 30
Oct. 21	5314	...	$a-1\cdot3$	$b+0\cdot8$	$c+1\cdot3$	$d+2\cdot5$	$g+3\cdot0$	8·1	+·2	0	7 30
Nov. 10	5334	...	$a-1\cdot3$	$b+1\cdot0$	$c+1\cdot5$	$d+2\cdot0$	$e+3\cdot0$	8·1	+·2	0	7 0
Nov. 22	5346	...	$a-1\cdot5$	$b+1\cdot3$	$c+1\cdot5$	$d+2\cdot0$	...	8·1	+·1	+·1	7 20
Nov. 29	5353	...	$a-1\cdot5$	$b+1\cdot0$	$c+1\cdot5$	$d+2\cdot0$	$f+3\cdot0$	8·0	+·2	+·1	7 30
Dec. 13	5367	...	$a-1\cdot5$	$b+0\cdot8$	$c+1\cdot5$	$d+2\cdot0$	$g+3\cdot0$	8·2	+·2	0	6 30

R Cygni.

R. A. $19^h\ 34^m\ 8^s$. Dec. $+49°\ 58'{\cdot}6$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1887 May 21	0413	...	2−1·5	=5	=6	=7	10+0·5	9·1	0	−·1	...
June 9	0432	...	2−2·0, 10+1·0	3+0·5	5+1·0	6+1·0	7+1·0	8·5	+·2	−·1	...
June 27	0450	...	2−1·5	5+1·0	6+1·2	7+1·2	10+2·0	8·2	+·2	−·1	...
July 18	0471	...	2−1·0	5+0·7	6+0·5	7+0·7	10+1·3	8·5	+·2	−·1	...
Aug. 9	0493	...	3+0·5	4−0·5	=6	10+0·5	...	9·0	+·1	−·1	...
Sept. 8	0523	...	8−0·3	10+0·1	...	...	...	9·9	0	−·1	...
Sept. 23	0538	...	10−0·2	11+0·7	12+2·0	13+2·0	14+2·0	9·9	+·2	−·2	...
Oct. 12	0557	...	3−1·0	10−0·5	11+1·0	...	...	10·1	−·1	−·2	...
Oct. 21	0566	...	10−0·5	11+0·3	13+1·0	14+1·0	=15	10·6	+·1	−·2	...
Nov. 8	0584	80	10−1·0	=11	12+1·0	13+1·0	14+1·0	10·8	+·1	−·2	...
Nov. 20	0596	80	10−2·0	11−0·5	12−0·6	13−0·5	14−0·5	12·0	−·2	−·2	...
Dec. 6	0612	80	10−2·5, 14+0·5	11−1·0	=β	α+0·5	13+0·5	11·5	0	−·2	...
1888 Apr. 14	0742	...	12−1·0	13−1·0	14−1·0	...	...	12·7	−·2	−·1	...
May 1	0759	...	=11	12+1·0	13+0·3	14+0·3	...	11·1	+·1	−·1	...
May 12	0770	...	5−1·5	6−1·5	7−1·0	10−0·3	11+0·5	10·5	−·1	−·3	...
May 31	0789	...	=5	6−0·5	=7	10+1·0	11+2·0	9·3	+·1	−·3	...
June 27	0816	...	2−1·0	4+1·0	5+2·0	6+1·0	7+2·0	7·7	+·2	−·1	...
July 6	0825	...	1−1·5	2+0·5	4+1·5	6+2·0	10+2·5	7·0	+·2	+·2	...
July 12	0831	...	2−0·5, 7+3·0	3+2·0	4+2·0	5+3·0	6+2·5	6·7	+·2	−·1	...
July 18	0837	...	1−2·5	=2	3+3·0	4+2·0	6+2·5	6·8	+·1	+·2	...
July 26	0845	...	2−0·2, 7+2·0	3+1·8	4+1·0	5+2·0	6+2·0	7·3	+·2	−·1	...
Aug. 9	0859	...	2−0·3, 7+2·0	3+2·0	4+1·0	5+2·0	6+2·0	7·3	+·2	−·1	...
Aug. 21	0871	...	2−0·5, 7+1·6	3+1·5	4+1·0	5+1·6	6+1·5	7·6	+·2	−·1	...
Sept. 7	0888	...	2−1·5	5+1·0	6+0·5	7+0·7	10+1·5	8·5	+·2	−·1	...
Oct. 1	0912	...	2−2·0	5+0·5	=6	=7	10+1·0	9·0	+·1	−·1	...
Oct. 15	0926	...	2−2·0	5+1·0	7+1·0	10+1·5	...	8·5	+·1	−·1	...
Nov. 11	0953	...	5−2·0, 12+2·0	6−2·5	7−2·3	10+0·5	11+1·0	10·5	0	−·2	...
Dec. 6	0978	...	10−0·5	11+1·0	13+2·0	14+2·0	...	9·9	+·1	−·2	...
Dec. 29	1001	...	10−1·0	11−0·2	...	...	...	11·1	−·2	−·3	...
1889 Jan. 20	1023	...	10−2·0	11−0·3	13+1·3	14+1·0	...	11·0	0	−·2	...
Feb. 12	1046	...	11−1·0	=13	=14	...	...	11·7	−·1	−·2	...
Mar. 27	1089	...	11−1·0	14−1·0	...	...	...	12·3	−·2	−·2	...
June 29	1183	...	10−2·0	13−1·0	14−1·5	...	...	12·5	−·2	−·1	...
July 5	1189	...	11−2·0	=α	13−1·0	14−1·0	...	12·7	−·2	−·1	...

Star 12 is a pair which we may call α (the preceding star) and β (the following star). At first α and β were judged unequal, but later they were judged equal. When this is the case the star is called merely 12.

1888 Jan. 5. Not seen with powers 80, 90, 136; first caught with 206.

1888 Jan. 18. Not seen with any power, nor on Feb. 1, Mar. 2.

1889 April 22. Not seen, nor on May 15, May 23, June 5, June 16.

R CYGNI—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1889 July 26	1210	...	10−2·0	11−1·0	=13	=14	...	11·8	−·1	−·2	...
Aug. 17	1232	...	2−2·5	3−1·0	10−0·5	11+1·0	...	10·0	+·1	−·1	...
Sept. 4	1250	...	1−3·0	2−1·3	3+0·5	5+1·0	7+1·0	8·4	+·1	+·2	...
Sept. 16	1262	...	4+1·3	5+1·8	7+1·8	...	...	7·5	+·3	−·1	...
Oct. 5	1281	...	1−2·5	2−0·7	3+1·3	5+2·0	7+2·0	7·6	+·1	+·2	...
Oct. 21	1297	...	1−1·5	2−0·5	5+1·0	7+1·0	10+2·0	7·8	+·1	+·1	...
Nov. 6	1313	...	1−2·0	2−1·0	3+1·0	5+2·0	7+2·0	7·6	+·1	+·2	...
Nov. 27	1334	...	2−1·5	3+1·0	4+0·8	5+1·5	7+1·3	8·0	+·2	0	...
Dec. 3	1340	...	2−1·0	3+0·5	4−0·2	5+1·0	7+1·0	8·3	+·1	0	...
Dec. 13	1350	...	2−1·0	=4	5+0·7	7+0·7	10+1·5	8·4	+·1	−·1	...
Dec. 24	1361	...	2−1·5	3+0·5	5+0·7	7+0·7	10+1·5	8·5	+·2	−·1	...
1890 Jan. 1	1369	...	2−1·5	3+0·2	4−0·3	5+0·3	7+0·3	8·8	+·1	0	...
Jan. 12	1380	...	3−0·5	4−1·5	5+0·5	7+0·5	10+1·0	9·2	+·1	−·1	...
Feb. 7	1406	...	2−2·0	3−0·3	=5	10+0·7	11+2·0	9·1	0	−·1	...
Feb. 27	1426	...	3−1·0	4−1·5	5−0·3	7−0·3	10−0·3	9·9	−·3	−·1	...
Mar. 19	1446	80	10−1·0	11+0·3	13+1·0	14+1·0	...	10·7	+·1	−·2	...
Apr. 3	1461	80	10−2·0	=11	...	...	...	11·5	0	−·3	...
Apr. 25	1483	80	10−2·0	11−1·0	13−0·2	14−0·5	17+0·5	11·9	−·2	−·2	...
May 22	1510	132	10−3·5	12−1·0	13−2·0	14−2·0	17−0·5	13·3	−·2	−·1	...
Aug. 23	1603	132	10−3·0	13−1·0	14−1·0	...	...	12·7	−·2	−·1	...
Sept. 7	1618	...	10−2·0	11−0·5	13+1·0	14+0·5	...	11·2	0	−·2	...
Oct. 2	1643	...	3−1·5	5−1·0	7−0·7	10+0·3	11+1·0	10·1	0	−·2	...
Oct. 11	1652	...	2−1·5	3−0·7	=5	7+0·5	10+1·0	9·0	0	−·1	...
Oct. 26	1667	...	2−1·5	3+1·0	4+0·5	6+1·2	10+1·5	8·2	+·2	0	...
Nov. 7	1679	...	2−1·0	3+1·3	4+1·0	5+1·7	6+1·3	7·7	+·2	0	...
Nov. 25	1697	...	2−1·0	3+1·2	4+1·0	5+1·7	7+1·7	7·7	+·2	0	...
Dec. 13	1715	...	2−1·0	3+2·0	4+1·5	6+1·7	...	7·4	−·1	0	...
Dec. 24	1726	...	2−1·5	3+1·5	4+1·0	5+1·5	7+1·5	7·8	−·2	0	...
1891 Jan. 4	1737	...	1−3·0	2−1·5	3+1·2	4+0·6	5+1·5	8·0	+·1	+·2	...
Jan. 12	1745	...	2−1·5	3+0·5	4−0·5	5+1·7	7+1·5	8·3	+·1	0	...
Jan. 18	1751	...	2−1·5	3+1·0	=4	5+1·7	7+2·0	8·0	+·1	0	...
Feb. 5	1769	...	2−2·0	5+1·3	7+1·0	10+1·5	...	8·4	+·1	−·1	...
Feb. 12	1776	...	2−1·3	=3	4−0·7	5+1·2	7+1·0	8·6	0	0	...
Feb. 22	1786	...	3−0·2	4−0·7	5+0·8	6+0·2	7+0·8	8·8	+·1	−·1	...
Mar. 30	1822	...	3−1·3	5−0·5	7−0·5	10+0·5	11+2·0	9·7	−·1	−·2	...
Apr. 17	1840	...	3−1·3	5−0·8	7−0·8	=10	11+2·0	9·6	+·1	−·2	...
May 12	1865	...	5−1·5	10−1·0	11+0·7	13+1·5	14+1·5	10·5	0	−·2	...
May 30	1883	...	7−2·0	10−1·2	11+0·3	...	...	11·1	0	−·3	...
June 9	1893	...	5−2·0	7−2·0	10−1·3	11+0·5	...	11·1	−·1	−·2	...
July 4	1918	80	10−2·0	11−0·7	13−0·3	14−0·3	...	11·8	−·2	−·2	...
July 25	1939	132	10−2·5	11−1·5	17−0·5	...	...	12·6	−·2	−·2	...
Aug. 15	1960	132	11−3·0	13−2·0	14−2·0	17−1·0	...	13·7	−·2	−·1	...
Aug. 28	1973	132	17−1·0	...	...	...	...	13·5	−·2	0	...
Oct. 23	2029	80	10−3·0	11−2·0	13−1·0	14−1·0	17+0·5	12·6	−·1	−·2	...

1890 June 8. Not seen, nor on June 19, June 24, July 3, July 11, July 21, Aug. 1.
1891 Sept. 11. Not seen, nor on Oct. 2.

R Cygni—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections. Scale.	Corrections. Stars.	Apparent Correction to Harvard.
1891 Oct. 29	2035	80	10−3·0	11−2·0	13−1·2	14−1·0	17+0·7	12·6	−·1	−·2	...
Nov. 16	2053	...	3−2·2	10−1·5	11−0·5	13+0·5	14+0·5	11·2	0	−·2	...
Nov. 27	2064	...	3−2·5	10−1·0	11+0·5	13+1·0	14+1·0	10·8	0	−·2	...
Dec. 11	2078	...	3−1·3	6−0·8	7−0·5	=10	11+2·0	9·8	−·1	−·2	...
Dec. 21	2088	...	3−0·5	5−0·5	7−0·5	10+1·0	11+2·0	9·4	−·1	−·2	...
1892 Jan. 27	2125	...	2−0·7	3+1·3	6+1·3	10+2·5	11+3·0	7·7	+·2	−·1	...
Feb. 21	2150	...	2−0·7	3+1·3	5+2·0	6+1·3	7+2·0	7·5	+·2	−·1	...
Mar. 5	2163	...	1−2·5	2−1·0	3+1·5	6+1·5	...	7·7	0	+·2	...
Mar. 12	2170	...	1−2·3	2−0·6	3+1·3	6+1·3	10+2·0	7·7	+·1	+·2	...
Mar. 22	2180	...	2−1·0	10+2·0	...	...	...	8·0	0	0	...
Apr. 2	2191	...	2−1·0	3+1·3	5+1·6	6+1·3	10+2·0	7·8	+·2	−·1	...
Apr. 26	2215	...	2−1·5	3+0·5	4+0·2	6+0·5	10+1·5	8·5	+·2	0	...
May 24	2243	...	3−0·3	5+0·5	6−0·3	10+1·3	11+2·0	8·9	+·1	−·2	...
June 5	2255	...	3−0·7	5−0·3	6−1·0	7+0·5	10+0·5	9·5	−·1	−·2	...
June 14	2264	...	3−1·2	5−0·6	7−0·3	10+0·2	11+1·3	9·8	−·1	−·2	...
June 30	2280	...	5−1·4	6−1·7	7−1·4	10−0·2	11+1·3	10·4	−·1	−·3	...
July 11	2291	...	{5−1·5 14+1·5}	7−1·5	10−0·5	11+1·0	13+1·5	10·4	0	−·2	...
July 22	2302	...	5−1·6	10−1·3	=11	13+1·0	14+1·0	10·9	0	−·2	...
Aug. 3	2314	...	10−1·5	11−0·3	13+1·0	14+1·0	16+1·5	11·3	0	−·2	...
Aug. 19	2330	80	10−2·0	11−1·0	=13	14−0·5	17+0·3	11·9	−·1	−·2	...
Sept. 12	2354	132	13−0·5	14−1·0	17−0·5	...	...	12·6	−·2	−·1	...
Sept. 28	2370	132	13−2·0	14−1·0	17−0·3	...	...	13·0	−·2	−·1	...
1893 Jan. 17	2481	132	10−3·0	11−1·5	12−0·5	...	...	12·6	−·1	−·2	...
Feb. 5	2500	...	3−3·0	10−2·0	11−0·3	12+0·5	14+0·5	11·5	0	−·1	...
Mar. 4	2527	...	=3	5+0·3	6−0·3	10+1·0	11+2·0	9·0	+·1	−·2	...
Mar. 11	2534	...	2−1·3	3+0·2	5+0·7	6+0·2	7+0·7	8·6	+·1	−·1	...
Mar. 19	2542	...	2−1·2	=3	4−0·5	5+1·0	10+2·0	8·4	0	0	...
Apr. 2	2556	...	2−0·7	3+1·0	4+0·6	5+2·0	6+1·0	7·8	+·1	0	...
Apr. 10	2564	...	2−1·0	3+1·0	4+0·3	5+2·0	6+1·3	7·9	+·1	0	...
Apr. 28	2582	...	2−1·0	3+1·0	=4	6+0·6	10+2·0	8·2	+·1	0	...
May 9	2593	...	2−1·0	3+0·5	4+0·5	6+1·0	10+1·5	8·2	+·1	0	...
May 25	2609	...	2−1·3	3+0·6	4+0·5	6+1·0	10+1·6	8·2	+·1	0	...
June 7	2622	...	2−1·0	3+1·0	4+0·3	5+1·5	10+2·0	7·9	+·1	0	...
June 14	2629	...	2−1·5	3+0·5	=4	5+1·0	10+1·5	8·4	+·1	0	...
June 29	2644	...	2−1·5	3+0·5	4−0·8	5+1·3	10+1·3	8·5	0	0	...
July 22	2667	...	=3	4−1·0	5−1·0	=6	10+1·0	9·3	0	−·1	...
Aug. 14	2690	...	3−1·0	5−0·5	7−0·5	10+0·6	11+2·5	9·5	0	−·2	...
Aug. 23	2699	...	3−1·0	5−1·0	7−1·2	=10	11+2·0	9·9	−·1	−·2	...
Sept. 4	2711	...	3−1·3	5−1·3	7−1·3	10−0·3	11+1·5	10·2	−·1	−·2	...
Sept. 15	2722	...	5−1·3	7−1·3	10−0·5	11+0·7	...	10·5	−·1	−·2	...
Oct. 1	2738	...	5−1·5	10−1·0	11+0·6	13+1·5	14+1·0	10·6	0	−·2	...
Oct. 12	2749	...	10−2·0	11−1·0	13−0·3	14−0·3	...	12·0	−·1	−·2	...
Nov. 6	2774	...	10−2·0	11−0·5	=13	=14	...	11·6	0	−·2	...

1892 Oct. 10. Not seen, nor on Oct. 19, Nov. 6, Nov. 26, Dec. 9, Dec. 25.
1893 Jan. 4. Barely caught by glimpses with 132.

R CYGNI—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1893 Dec. 3	2801	132	11−3·0	13−1·0	14−1·0	=17	...	13·0	−·1	−·1	...
1894 Mar. 24	2912	132	10 2·5	11−1·3	=13	14−0·5	...	12·1	−·1	−·2	...
Apr. 8	2927	80	10−2·0	11−0·3	13+0·5	=14	...	11·5	0	−·2	...
Apr. 22	2941	...	10−1·0	11+1·0	...	...	...	10·5	0	−·3	...
May 1	2950	...	3−1·0	=5	7−0·3	10+0·5	11+1·5	9·6	0	−·2	...
May 10	2959	...	2−1·5	=3	4−0·5	6+0·3	10+1·0	8·8	0	0	...
May 26	2975	...	2−1·2	3+1·0	7+1·0	10+1·5	11+2·0	8·3	+·1	−·1	...
June 13	2993	...	2−1·0	3+1·0	4+0·8	6+1·5	10+2·0	7·8	+·1	0	...
June 27	3007	...	1−1·5	2−0·7	3+1·3	4+1·0	10+1·5	7·6	0	+·2	...
July 7	3017	...	1−2·0	2−0·7	3+1·0	5+1·3	10+1·5	7·9	0	+·2	...
July 21	3031	...	1−2·0	2−1·0	3+1·0	6+1·0	10+1·3	7·9	0	+·2	...
Aug. 26	3067	...	2−1·3	3+0·2	6+0·5	7+0·2	10+1·3	8·7	+·1	−·1	...
Sept. 1	3073	...	2−1·3	3−0·2	5+0·6	6+0·2	10+1·0	8·7	0	−·1	...
Sept. 6	3078	...	2−1·3	3−0·2	5+0·5	=6	10+1·3	8·7	0	−·1	...
Sept. 29	3101	...	3−0·5	=5	6−1·0	10+0·7	11+1·5	9·5	0	−·2	...
Oct. 14	3116	...	3−1·0	5−0·3	10+0·3	11+1·2	14+2·0	9·7	0	−·1	...
Nov. 5	3138	...	3−1·2	5−1·2	10−0·8	11+1·0	14+1·3	10·3	0	−·1	...
Nov. 23	3156	...	5−1·5	10−1·0	=11	13+1·0	14+1·5	10·7	0	−·2	...
Dec. 8	3171	...	10−2·0	11−0·6	13+1·0	14+1·0	17+2·0	11·0	0	−·2	...
Dec. 20	3183	...	10−2·0	11−1·0	13+0·2	14+0·2	...	11·7	0	−·2	...
1895 Jan. 22	3216	132	11−2·0	13−1·0	14−1·5	...	...	12·9	−·1	−·2	...
Apr. 29	3313	132	10−2·0	11−0·5	13+0·5	14+0·5	...	11·4	0	−·2	...
May 6	3320	...	3−2·0	10−1·3	11+0·5	13+1·0	14+1·0	10·8	0	−·2	...
May 14	3328	...	3−1·3	5−1·7	6−1·3	10−0·5	11+1·0	10·4	−·1	−·2	...
May 29	3343	...	2−1·3	3−0·8	5−0·2	10+0·2	11+2·0	9·2	0	−·1	...
June 7	3352	...	2−1·5	3−0·5	5−0·2	10+0·8	11+1·5	9·2	0	−·1	...
June 23	3368	...	2−1·3	3+0·8	5+1·0	7+1·0	10+1·0	8·4	+·1	−·1	...
July 7	3382	...	1−2·0	2−0·5	3+1·2	6+1·0	10+1·5	7·8	0	+·2	...
Aug. 12	3418	...	1−1·5	2+0·2	3+1·2	5+2·0	10+2·3	7·3	+·1	+·2	...
Aug. 27	3433	...	1−1·5	=2	3+1·0	10+2·0	...	7·4	0	+·3	...
Sept. 18	3455	...	1−1·7	2−1·0	3+0·5	10+1·3	11+2·0	8·2	0	+·1	...
Oct. 4	3471	...	2−1·3	3+1·0	5+1·0	10+1·2	11+1·5	8·5	+·1	−·1	...
Oct. 23	3490	...	2−1·3	3+0·2	5+0·2	10+1·2	11+1·5	8·8	+·1	−·1	...
Nov. 1	3499	...	=3	5+0·5	6−0·3	10+1·0	11+1·5	9·1	+·1	−·2	...
Nov. 23	3521	...	3−1·0	5−0·8	6−1·3	10+0·3	11+1·6	9·8	0	−·2	...
Dec. 1	3529	...	3−1·2	5−0·3	6−1·0	10−0·1	11+1·0	9·9	−·1	−·2	...
Dec. 16	3544	...	5−1·0	10−0·7	11+0·3	13+1·3	14+1·3	10·5	0	−·2	...
1896 Jan. 9	3568	...	5−2·0	10−2·0	=11	13+1·0	14+1·0	11·1	0	−·2	...
Ju'y 20	3761	80	2−3·0	10−2·0	11−1·0	=15	...	11·2	−·1	−·1	...

1893 Dec. 30. Not seen, nor on Jan. 23, Feb. 13, Feb. 21, Mar. 6, Mar. 16. On Feb. 13 a diffuse bluish nebula was seen in the place of the variable, suspected also on Jan. 23. Nebula seen again Feb. 21, and on Mar. 6 a condensed centre was suspected, "as if the star was about to appear." On Mar. 24, after reappearance, the star was well defined. No nebulosity visible.

1895 Feb. 11. Not seen, but nebula seen. 1895 Feb. 19. No trace of star, and scarcely of any nebula.

1895 Mar. 7. No star seen, but nebula condensed in centre, as if star was about to reappear, but on Mar. 22 and April 10 no trace of nebula or variable visible.

1896 Feb. 1. Just seen 132; not seen on following dates: Feb. 22, Mar. 14, Mar. 29, April 12, April 21, Mar. 3, May 8, May 20, May 28, June 11, June 21, July 5. Nebula seen Mar. 14, Mar. 29, May 8, July 5; condensed centre Mar. 29, July 5.

R Cygni—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1896 Aug. 6	3778	...	5−1·5	10−1·2	11−0·2	=13	=14	11·3	−·1	−·2	...
Aug. 26	3798	...	2−2·0	3−1·0	4−1·3	=10	11+1·0	9·8	−·1	−·1	...
Sept. 15	3818	...	2−1·3	3+0·2	4−0·5	10+1·3	11+2·0	8·8	0	−·1	...
Sept. 27	3830	...	2−1·3	3+0·3	5+1·0	6+0·6	11+2·0	8·6	+·1	−·1	...
Oct. 18	3851	...	2−1·3	3+1·0	4+1·0	6+0·7	10+1·3	8·2	+·1	0	...
Oct. 28	3861	...	2−1·0	3+0·5	4+1·0	6+1·0	10+1·3	8·1	+·1	0	...
Nov. 6	3870	...	2−1·3	3+1·2	4+0·6	6+1·0	10+1·5	8 1	+·1	0	...
Dec. 9	3903	...	2−1·0	=3	=6	10+1·0	11+1·7	8·9	0	−·1	...
Dec. 23	3917	...	2−1·3	=3	=4	10+1·0	11+1·5	8·9	0	−·1	...
1897 Jan. 17	3942	...	2−1·5	3−0·5	4−0·8	10+1·0	11+2·0	9·1	0	−·1	...
Feb. 7	3963	...	3−1·2	5−0·5	7−0·5	10−0·2	11+1·0	10·0	−·1	−·2	...
Feb. 17	3973	...	3−0·7	5−1·0	7−1·0	10−0·5	11+0·5	10·2	−·1	−·2	...
Apr. 10	4025	132	5−2·0	10−2·3	11−1·2	13−0·5	14−1·0	12 1	−·1	−·2	...
Apr. 23	4038	132	11−1·7	13−1·0	14−1·0	...	...	12·6	−·1	−·2	...
Oct. 19	4217	...	3−2·0	10−1·2	11−0·3	13+·05	...	11·1	0	−·2	...
Oct. 27	4225	...	2−3·0	3−1 0	5−1·0	10+0·3	11+1·2	9·9	0	−·1	...
Nov. 2	4231	...	2−2·3	3−0·2	5−0·5	6−1·0	10+1·0	9·4	−·1	−·1	...
Nov. 18	4247	...	2−1·3	3+1·0	4+1·0	6+1·0	10+1·6	8·0	+·1	0	...
Nov. 28	4257	...	2−1·3	3+1·6	4+1·0	6+1·6	10+2·5	7·6	+·1	0	...
Dec. 11	4270	...	2−1·3	3+0·7	6+1·0	10+1·5	11+2·0	8·4	+·1	−·1	...
Dec. 20	4279	...	2−1 3	3+1·3	4+1·3	10+2 5	11+3·0	7·7	+·1	−·1	...
1898 Jan. 7	4297	...	2−1·0	3+1·0	4+1·0	5+1·3	10+1·5	7·9	+·2	0	...
Jan. 21	4311	...	1−2·5	2−1·0	3+1·0	...	...	7·9	−·1	+·4	...
Feb. 2	4323	...	2−1·3	3+1·0	4+1·3	10+2·0	11+3·0	7·9	+·2	−·1	...
Feb. 20	4341	...	2−1·5	3+0·2	4−1·0	6−0·8	10+1·3	9·1	−·1	0	...
Mar. 3	4352	...	2−1·5	=3	5+1·0	10+2·0	11+2·5	8·4	+·1	−·1	...
Mar. 14	4363	...	2−2·0	3−0·5	4−1·3	6−1·0	10+1·0	9·5	−·2	0	...
Apr. 4	4384	...	2−1·5	3−0·8	5−0 2	6−1·3	10+0·2	9·5	−·2	−·1	...
Apr. 12	4392	...	3−1·2	10−1·0	11+1·0	13+2·0	14+2·0	10·0	+·1	−·2	...
Apr. 29	4409	...	3−2·3	5−1·5	7−1·0	10−1·5	11+0·5	10·9	−·1	−·2	...
May 12	4422	...	5−1·3	10−1·3	=11	13+1·0	14+0·5	10·9	0	−·2	...
May 23	4433	...	3−2·0	5−1·3	7−1·3	10−1·3	=11	10·9	−·2	−·2	...
June 7	4448	...	4−1·0	5−1·5	10−2 0	13+0·2	=14	11·1	−·1	−·1	...
June 22	4463	80	5−2·5	10−2·0	11−1·0	=13	14−0·5	11·9	−·2	−·2	...
Nov. 5	4599	132	10−3·0	11−2·0	13−1·0	14−1·0	...	12·8	−·2	−·2	...
Nov. 18	4612	80	10−2·5	11−1·5	13−0·5	14−0·5	...	12·2	−·2	−·2	...
Dec 9	4633	...	3−2·7	10−2·0	11−1·0	13+0·5	14+0·5	11·5	0	−·2	...
Dec. 20	4644	...	3−1·5	5−1·3	10−1·0	11+0·3	14+1·2	10·6	0	−·1	...
Dec. 29	4653	...	2−2·0	3−0·5	4−1·3	10+0·3	11+1·5	9·5	−·1	−·1	...

1897 May 20. Not seen, nor on June 4, June 16, July 15, July 26, Aug. 19, Sept. 10. Nebula seen May 20, June 4, June 16, July 15. Condensed centre June 16, July 15.

1898 July 7. Nebulosity only. Aug. 13. No trace. Aug. 24. Nebula only. Sept. 16. Nebula with condensed centre. Oct. 3. No trace of star or nebula.

1899 Sept. 26, Oct. 7, Nov. 10, Dec. 25. Not seen. 1900 Jan. 9. Nebula seen.

[After 1898 the comparison stars were twice changed, a brief series of observations being made in 1899 with Harvard comparison stars, and another series commenced in 1900 with Knott's comparison stars. It seems unnecessary to give these observations at present.—H. H. T., Ed.]

χ Cygni.

R. A. $19^h\ 46^m\ 44^s$. Dec. $+32°\ 39'{\cdot}7$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1887 Jan. 20	0292	...	1−1·0	3+1·0	...	...	...	7·5	0	...	...
Feb. 5	0308	...	1+0·5	...	...	...	...	6·5	+·3	...	...
Apr. 26	0388	...	1−1·5	=2	3+1·0	5+1·5	...	7·6	+·1	...	...
May 21	0413	...	2−1·0	=3	5+0·5	10+0·5	...	8·4	+·1	...	...
June 10	0433	...	3−2·0	4−1·0	10−0·3	=15	...	9·7	−·2	...	...
June 27	0450	...	22+0·2	23+0·2	...	...	...	10·8	+·2	...	...
July 18	0471	...	12−0·5	22−1·0	23−1·0	...	...	11·8	−·2	...	...
Aug. 10	0494	...	22−1·5	23−1·5	...	...	...	12·5	−·2	...	...
Dec. 6	06 12	...	22−0·2	23−0·2	...	...	...	11·2	−·2	...	...
1888 Jan. 18	0655	...	=10	22+1·5	23+1·5	...	...	9·3	+·2	...	...
Feb. 1	0669	...	2−1·0	3−0·6	7+0·6	10+1·0	...	8·5	0	...	...
May 1	0759	...	1+1·5	2+2·5	3+3·0	...	...	5·3	+·3	...	...
May 12	0770	...	1+2·0	2+3·0	3+4·0	5+4·0	...	4·5	+·3	...	...
June 9	0798	...	1+0·5	2+2·0	3+2·5	5+3·0	...	5·8	+·3	...	...
June 27	0816	...	1−1·5	2−0·5	3+0·5	5+1·5	...	7·8	0	...	...
July 6	0825	...	1−2·0	2−0·3	3+0·6	5+1·5	...	7·8	0	...	...
July 12	0831	...	2−0·5	=3	=5	10+0·5	14+0·5	8·4	+·1	...	...
July 18	0837	...	2−1·5	3−1·0	5+0·7	10+0·7	...	8·7	0	...	...
Aug. 9	0859	...	10−0·3	=15	=16	...	...	9·6	−·1	...	...
Aug. 30	0880	...	22+0·5	23+0·5	...	...	...	10·5	+·2	...	...
Sept. 7	0888	...	=22	=23	...	...	...	11·0	0	...	...
Sept. 16	0897	...	22−1·3	23−1·3	...	...	...	12·3	−·2	...	...
Oct. 3	0914	...	22−1·5	23−1·5	24+0·2	25+0·2	26+0·2	12·3	0	...	...
Oct. 22	0933	...	24−0·5	=25	26−0·5	...	...	12·8	−·1	...	...
Nov. 20	0962	...	24−1·0	25−1·0	26−1·0	...	...	13·5	−·2	...	...
Dec. 10	0982	...	24−2·0	25−2·0	...	...	...	14·5	−·2	...	...
Dec. 29	1001	...	24−1·0	25−1·0	26−1·0	...	...	13·5	−·2	...	...
1889 Jan. 20	1023	...	=24	=25	=26	...	...	12·5	0	...	...
Apr. 22	1115	...	1+1·0	2+1·5	3+2·5	...	...	5·9	+·3	...	...
May 15	1138	...	1+2·0	2+3·0	3+4·0	5+4·0	...	4·5	+·3	...	...
May 23	1146	...	1+2·0	2+3·0	3+3·7	...	...	4·7	+·3	...	...
June 4	1158	...	1+1·5	2+2·0	3+2·5	5+3·0	...	5·5	+·3	...	...
June 18	1172	...	1+0·3	2+2·0	3+3·0	5+4·0	...	5·5	+·3	...	...
June 29	1183	...	1−0·5	2+1·7	3+2·5	...	...	6·4	+·1	...	...
July 5	1189	...	1−0·5	2+0·5	3+1·5	5+2·3	...	6·8	+·2	...	...
July 26	1210	...	2−1·0	3−0·7	...	...	...	8·7	−·3	...	...
Aug. 25	1240	...	10+0·5	16+0·5	...	...	...	8·9	+·3	...	...
Sept. 16	1262	...	22+0·2	23+0·2	...	...	...	10·8	+·2	...	...
Sept. 30	1276	...	=22	=23	25+1·5	26+1·0	...	11·1	+·1	...	...
Oct. 1	1297	...	22−1·0	23−1·0	=24	=25	=26	12·2	−·1	...	...
Nov. 21	1328	...	24−1·7	25−1·7	26−1·7	...	...	14·2	−·2	...	...
1890 Apr. 25	1483	...	2−1·5	3−0·5	10+1·0	...	...	8·6	−·1	...	...

χ CYGNI—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1890 May 5	1493	...	1−1·5	2−0·3	3+0·5	5+0·5	...	8·0	0	...	...
May 14	1502	...	2+0·3	3+1·5	...	...	...	7·0	+·3	...	...
May 22	1510	...	1+2·0	2+2·5	3+3·0	...	...	5·1	+·3	...	...
June 8	1527	...	1+3·0	2+3·5	3+4·0	...	...	4·1	+·3	...	...
June 14	1533	...	1+3·0	2+3·5	3+4·0	...	...	4·1	+·3	...	...
June 19	1538	...	1+2·5	2+3·0	3+3·5	5+3·5	...	4·7	+·3	...	...
June 24	1543	...	1+2·0	2+2·5	3+3·0	5+3·0	...	5·2	+·3	...	...
July 3	1552	...	1+2·0	2+2·5	3+3·0	5+3·5	...	5·0	+·3	...	...
July 11	1560	...	1+3·0	2+3·5	3+4·0	5+4·0	...	4·2	+·3	...	...
July 21	1570	...	1+2·0	2+2·5	3+3·0	5+3·0	...	5·2	+·3	...	...
Aug. 1	1581	...	1+1·5	2+2·0	3+2·5	5+2·5	...	5·7	+·3	...	...
Aug. 23	1603	...	1+1·0	2+2·0	3+2·5	...	...	5·8	+·3	...	...
Sept. 7	1618	...	1−1·0	2+0·5	3+1·0	5+1·7	...	7·2	+·2	...	...
Oct. 8	1649	...	2−1·0	3−0·5	14+1·5	16+1·5	...	8·4	0	...	...
Oct. 26	1667	...	2−1·5	5−1·0	10+1·0	14+0·3	...	8·9	0	...	...
Nov. 7	1679	...	10−0·7	=15	16+0·5	22+1·2	23+1·2	9·7	+·1	...	...
Nov. 25	1697	...	15−1·0	16−0·5	22+0·5	23+0·5	...	10·5	0	...	...
1891 Jan. 6	1739	...	24−0·2	=25	=26	...	...	12·6	−·1	...	...
May 12	1865	...	15−1·5	22+0·3	23−0·2	...	...	11·1	−·1	...	...
May 30	1883	...	15−1·0	=16	22+1·2	23+1·0	...	10·1	+·1	...	...
June 9	1893	...	15−0·5	=16	...	...	...	9·9	−·1	...	...
July 4	1918	...	1−1·3	2−0·5	=3	5+0·6	14+1·3	8·1	0	...	...
July 10	1924	...	1−1·0	2+0·5	3+1·3	5+1·5	14+2·0	7·2	+·2	...	...
July 19	1933	...	1+1·5	2+2·3	3+3·0	5+3·0	14+3·3	5·5	+·3	...	...
July 25	1939	...	1+1·5	2+1·8	3+2·0	5+2·5	14+3·0	5·9	+·3	...	...
Aug. 15	1960	...	1+2·0	2+3·0	3+3·5	10+4·0	...	4·8	+·3	...	...
Aug. 28	1973	...	1+1·3	2+2·0	3+2·3	5+3·0	14+3·3	5·7	+·3	...	...
Sept. 11	1987	...	1+1·3	2+2·0	3+2·2	5+2·5	14+3·0	5·9	+·3	...	...
Oct. 2	2008	...	1+0·6	2+1·0	3+1·6	5+1·8	14+2·3	6·6	+·3	...	...
Oct. 23	2029	...	1−1·5	2−0·5	3+0·5	5+1·0	14+1·5	7·9	+·1	...	...
Oct. 30	2036	...	1−1·6	2−1·0	3+0·5	5+0·7	14+1·3	8·1	+·1	...	...
Nov. 16	2053	...	2−1·2	3−0·7	5−0·3	10+1·2	14+0·7	8·6	−·1	...	...
Nov. 27	2064	...	5−0·3	=10	14+0·7	22+2·0	23+2·0	8·8	+·1	...	...
Dec. 11	2078	...	5−1·3	7−1·0	10−0·5	=14	15+0·5	9·4	−·1	...	...
Dec. 21	2088	...	5−1·3	10−1·0	14−0·5	15−0·3	16+0·3	9·8	−·2	...	...
1892 Feb. 1	2130	...	22−1·0	23−1·0	24+0·3	25+0·3	26+0·3	12·0	0	...	...
June 5	2255	...	15−1·3	22−0·2	23−0·5	24+1·5	26+1·5	11·1	0	...	...
June 14	2264	...	10−1·5	15−0·5	18+1·0	22+1·0	23+0·8	10·0	0	...	...
June 30	2280	...	5−1·0	9+1·0	10−0·2	=14	15+0·2	9·1	0	...	...
July 11	2291	...	5−0·5	=8	9+0·5	10+0·2	14+0·2	8·9	+·1	...	...
July 22	2302	...	2−1·0	10+0·5	=14	15+0·7	16+0·7	8·9	+·1	...	...
Aug. 3	2314	...	2−0·7	3+0·3	5−0·3	10+0·7	14+0·7	8·4	+·1	...	...
Aug. 19	2330	...	1−0·3	2+1·0	3+1·3	10+1·6	14+1·6	7·2	+·2	...	...
Sept. 3	2345	...	1+1·5	2+2·0	3+2·0	5+2·5	14+3·0	5·9	+·3	...	...
Sept. 13	2355	...	1+3·0	2+3·5	3+4·0	10+5·0	14+5·0	4·1	+·3	...	...
Sept. 24	2366	...	1+1·3	2+1·6	3+2·0	5+2·0	14+3·0	6·1	+·3	...	...

χ Cygni—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1892 Sept. 28	2370	...	1+1·5	2+2·0	3+2·0	10+3·0	14+3·0	5·9	+·3	...	...
Oct. 8	2380	...	1+1·5	2+2·0	3+2·0	10+3·0	14+3·0	5·9	+·3	...	...
Oct. 19	2391	...	1+1·0	2+1·5	3+2·0	10+2·5	14+2·5	6·3	+·3	...	...
Oct. 31	2403	...	1+0·5	2+1·5	3+1·8	5+1·8	14+2·3	6·5	+·3	...	...
Nov. 10	2413	...	1−0·6	2−0·4	3+0·3	10+1·2	14+1·2	7·9	+·1	...	...
Nov. 26	2429	...	1−1·0	2−0·3	3+0·6	5+1·0	14+1·5	7·7	+·1	...	...
Dec. 9	2442	...	2−1·0	3−0·3	5+0·7	10+1·3	14+1·3	8·1	+·1	...	...
Dec. 25	2458	...	2−1·0	3−0·5	5+0·2	10+1·0	14+1·0	8·4	+·1	...	...
1893 Jan. 11	2475	...	5−1·0	=10	=14	22+2·0	23+2·0	9·1	0	...	...
Jan. 18	2482	...	5−1·0	10−0·3	14−0·3	22+1·5	23+1·5	9·4	0	...	...
Feb. 8	2503	...	10−2·0	15−0·5	=16	22+0·5	23+0·5	10·4	0	...	...
May 11	2595	...	22−0·7	23−1·0	24+0·7	25+0·3	26+0·7	11·8	0	...	...
May 25	2609	...	24−1·0	25−1·0	26−2·0	...	...	13·8	−·1	...	...
June 2	2617	...	24−1·0	25−1·0	26−2·0	...	...	13·8	−·1	...	...
June 11	2626	...	22−3·0	23−3·0	24−0·7	25−0·7	26−1·0	13·5	−·1	...	...
July 17	2662	...	22−0·5	23−0·5	24+1·0	25+1·0	26+1·0	11·4	0	...	...
Aug. 8	2684	...	14−1·0	15−0·5	16−0·5	22+1·0	23+1·0	10·1	0	...	...
Aug. 23	2699	...	5−1·5	=10	14−0·5	15+1·0	16+1·0	9·2	0	...	...
Sept. 4	2711	...	2−1·3	3−0·8	5−0·5	10+1·0	14+0·5	8·7	0	...	...
Sept. 15	2722	...	2−1·0	3−0·5	=5	10+0·3	14+0·3	8·7	0	...	...
Oct. 1	2738	...	1−1·0	2+0·7	3+1·0	14+1·5	15+2·0	7·5	+·1	...	...
Oct. 12	2749	...	1+1·3	2+1·3	3+2·0	5+2·5	14+3·0	6·1	+·2	...	...
Nov. 6	2774	...	1+2·0	2+2·5	3+3·0	15+4·0	16+4·0	5·4	+·2	...	...
Nov. 20	2788	...	1+1·5	2+1·5	3+2·0	10+3·0	14+3·0	6·0	+·2	...	...
Dec. 10	2808	...	1+1·0	2+1·5	3+2·0	5+2·0	14+3·0	6·2	+·2	...	...
Dec. 21	2819	...	1+0·6	2+1·3	3+1·7	5+2·0	14+3·0	6·4	+·2	...	...
1894 Jan. 20	2849	...	1−1·0	2+0·3	3+1·0	5+1·3	14+1·7	7·4	+·1	...	...
Feb. 3	2863	...	2−0·5	3+0·5	5+1·0	10+1·5	14+1·5	7·7	+·1	...	...
May 10	2959	...	22−2·0	23−2·0	24+0·5	=25	26−1·0	12·7	0	...	...
May 26	2975	...	25−1·0	26−1·0	...	...	...	13·5	−·1	...	...
June 13	2993	...	24−1·0	25−1·0	26−1·0	...	...	13·5	−·1	...	...
June 27	3007	...	24−1·0	25−1·0	26−1·0	...	...	13·5	−·1	...	...
July 7	3017	...	24−1·4	25−1·4	26−1·4	...	...	13·9	−·1	...	...
July 27	3037	...	22−2·5	23−2·5	24−0·3	25−0·3	26−1·0	13·1	−·1	...	...
Aug. 27	3068	...	5−2·0	14−1·3	16−1·0	22−0·5	23+0·5	10·8	−·1	...	...
Sept. 6	3078	...	14−1·2	15−1·0	16−1·0	=22	23−0·3	10·8	−·1	...	...
Sept. 29	3101	...	5−1·3	10−1·0	14−0·5	22+1·0	23+1·0	9·9	0	...	...
Oct. 14	3116	...	2−2·0	5−1·2	10−0·6	14−0·3	15+0·5	9·5	−·1	...	...
Nov. 5	3138	...	2−1·5	3−0·8	5+0·3	10+0·3	14+0·5	8·7	0	...	...
Nov. 23	3156	...	1−0·3	2+0·7	3+1·0	5+1·5	14+2·0	7·1	+·1	...	...
Dec. 8	3171	...	1+2·0	2+2·0	3+2·0	10+3·0	14+3·0	5·8	+·2	...	...
Dec. 20	3183	...	1+2·0	2+1·5	3+1·5	5+3·0	14+3·5	5·8	+·2	...	...
Dec. 31	3194	...	1+2·0	2+2·0	3+2·0	10+3·0	14+3·0	5·8	+·2	...	...
1895 Jan. 8	3202	...	1+1·5	2+1·5	3+1·5	5+2·0	14+3·0	6·2	+·2	...	...
Jan. 18	3212	...	1+1·3	2+1·5	3+2·0	5+2·0	14+3·0	6·1	+·2	...	...
Feb. 5	3230	...	1+1·5	2+2·0	3+2·0	5+2·5	14+3·0	5·9	+·2	...	...
Feb. 17	3242	...	1+1·0	2+1·5	3+2·0	5+3·0	...	5·9	+·2	...	...

χ CYGNI—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1895 May 6	3320	...	10−1·5	15−1·0	16−1·0	22+1·0	23+1·0	10·4	0	...	...
May 22	3336	...	10−2·0	14−2·0	22−0·4	23−0·4	26+1·0	11·3	−·1	...	...
May 29	3343	80	22−1·0	23−1·0	24+1·5	25+1·0	26+1·0	11·6	0	...	...
June 7	3352	80	22−0·8	23−1·0	24+1·0	25+1·0	26+0·5	11·8	0	...	...
June 23	3368	80	22−2·0	23−2·0	24+0·3	26−1·0	...	13·0	0	...	...
July 7	3382	80	22−2·5	23−2·5	24−1·0	25−1·0	26−0·5	13·4	−·1	...	...
Aug. 28	3434	132	22−2·0	23−3·0	24−1·0	25−1·5	26−1·5	13·7	−·1	...	...
Sept. 18	3455	...	22−2·0	23−2·0	24−0·5	25−0·5	26−0·8	13·0	−·1	...	...
Sept 28	3465	...	22−2·0	23−2·0	=24	25−0·5	=26	12·7	−·1	...	...
Oct. 17	3484	...	22−0·5	23−0·5	24+1·0	25+1·0	...	11·4	0	...	...
Oct. 23	3490	...	15−1·0	22−0·3	23−0·3	24+1·0	25+1·0	11·2	0	...	...
Nov. 1	3499	...	10−1·3	14−1·0	15−0·3	22+0·6	23+0·6	10·3	0	...	...
Nov. 13	3511	...	14−0·3	15−0·3	16+0·2	22+0·7	23+0·7	9·9	0	...	...
Nov. 30	3528	...	5−0·7	10−0·5	=14	15+0·7	16+0·7	9·2	0	...	...
Dec. 16	3544	...	1−1·3	3−0·8	=5	10+0·3	14+1·0	8·7	0	...	...
Dec. 31	3559	...	1−1·0	2+0·8	3+1·0	5+1·0	14+2·0	7·3	+·1	...	...
1896 Jan. 8	3567	...	1+0·5	2+1·3	3+1·6	5+2·0	14+2·5	6·5	+·2	...	...
Jan. 15	3574	...	1+1·3	2+1·6	3+2·0	15+2·5	16+2·5	6·5	+·2	...	...
Jan. 22	3581	...	1+0·3	2+1·0	3+1·3	10+1·6	15+2·0	7·1	+·2	...	...
Jan. 28	3587	...	1−0·3	2+1·0	3+1·4	15+1·6	16+1·6	7·4	+·1	...	...
Feb. 1	3591	...	1+0·4	2+1·0	3+1·4	14+2·0	15+2·0	6·9	+·2	...	...
Apr. 29	3679	...	5−1·0	=10	14−0·3	22+1·5	23+1·5	9·4	0	...	...
May 8	3688	...	5−1·0	10−0·3	14−0·3	22+1·0	23+1·0	9·6	0	...	...
May 20	3700	...	5−1·3	10−1·0	14−1·0	22+1·0	23+1·0	10·0	0	...	...
May 28	3708	...	15−1·2	16−1·2	22+0·6	23+0·6	26+2·0	10·6	0	...	...
June 11	3722	...	15−1·4	16−1·4	22−0·3	23−0·3	26+1·3	11·2	−·1	...	...
June 24	3735	...	15−1·6	16−1·6	22−1·0	23−1·0	26+1·0	11·6	−·1	...	...
July 20	3761	...	22−2·5	23−2·5	24−0·6	25−0·6	26−1·0	13·2	−·1	...	...
Aug. 4	3776	...	22−2·5	24−0·3	25−0·3	26−1·0	...	13·2	−·1	...	...
Aug. 16	3788	...	22−2·0	23−2·0	24−1·0	25−1·0	26−1·0	13·2	−·1	...	...
Aug. 26	3798	...	23−3·0	24−0·5	25−0·5	26−1·3	...	13·5	−·1	...	...
Sept. 7	3810	...	22−1·7	23−1·7	24+0·3	25+0·3	=26	12·4	0	...	...
Sept. 26	3829	...	24−1·0	25−2·0	26−2·0	...	...	14·2	−·1	...	...
Oct. 12	3845	...	22−3·0	23−3·0	24−0·5	25−0·5	26−0·5	13·3	−·1	...	...
Oct. 27	3860	...	22−1·5	23−1·5	=24	=25	=26	12·4	0	...	...
Nov. 4	3868	...	22−1·6	23−1·6	24+0·5	25+0·8	26+0·8	12·0	0	...	...
Nov. 16	3880	...	15−1·3	16−1·3	22−0·2	23−0·2	25+1·0	11·3	−·1	...	...
Dec. 9	3903	...	5−1·2	=10	=14	22+1·0	23+1·0	9·5	0	...	...
Dec. 23	3917	...	5−0·7	=10	=14	22+1·3	23+1·3	9·3	0	...	...
1897 Jan. 17	3942	...	1−1·3	5+1·0	14+1·6	22+1·8	23+1·8	8·3	+·1	...	...
Feb. 14	3970	..	1+1·0	...	...	...	...	6·0	+·2	...	...
Apr. 24	4039	...	1+1·0	2+2·0	3+2 3	5+2·3	10+3·0	6·0	+·2	...	...
May 7	4052	...	=1	2+1·3	3+1·3	5+1·0	10+2·0	7·0	+·2	...	...
May 20	4065	...	1−0·7	2+1·0	3+1·3	5+1·3	10+2·0	7·1	+·1	...	...
June 4	4080	...	1−1·0	2−0·2	3+0·7	5+0·7	14+1·3	7·8	0	...	...
June 16	4092	...	1−1·0	2−0·7	=3	5+0·7	10+1·0	8·1	0	...	...

χ CYGNI—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1897 July 15	4121	...	5−1·3 23+1·3	10−0·2	14−0·2	15+1·0	22+1·3	9·4	0	...	...
Aug. 3	4140	...	14−1·2	15−1·0	16−1·0	22+1·0	23+1·0	10·3	0	...	...
Sept. 10	4178	...	22−0·7	23−1·0	24+0·3	25+0·3	26+0·3	12·0	0	...	...
Sept. 30	4198	...	22−2·5	23−2·5	24−1·3	25−1·3	26−1·3	13·6	−·1	...	...
Oct. 6	4204	...	22−3·0	23−3·0	24−1·0	25−1·3	26−1·3	13·7	−·1	...	...
Oct. 12	4210	...	22−3·0	23−3·0	24−1·0	25−1·0	26−1·0	13·6	−·1	...	...
Oct. 20	4218	...	22−3·0	23−3·0	24−2·0	25−2·0	26−2·0	14·3	−·1	...	...
Nov. 2	4231	...	24−2·0	25−2·0	26−2·0	...	...	14·5	−·1	...	...
Nov. 15	4244	...	22−2·5	23−2·5	24−2·0	25−2·0	26−2·0	14·0	−·1	...	...
Nov. 29	4258	...	22−2·3	23−2·3	24−1·0	25−1·0	26−1·0	13·3	−·1	...	...
Dec. 11	4270	...	22−2·0	23−2·0	=24	25−0·5	26−0·5	12·8	−·1	...	...
Dec. 20	4279	...	15−2·0	22−1·0	23−1·2	24+1·0	26+1·0	11·7	0	...	...
1898 Feb. 2	4323	...	14−1·5	15−1·5	16−1·0	22+1·0	23+1·0	10·5	0	...	...

[After this date a new set of comparison stars was used, and the observations will be more appropriately included with a future series.—H. H. T., ED.]

S CYGNI.

R. A. $20^h\ 3^m\ 24^s$. Dec. $+57°\ 41'·9$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1892 Feb. 1	2130	...	$d-1·5$	$e-1·0$	$f-0·5$	$g-0·5$	$k+1·0$	10·5	−·1	+·2	...
Feb. 23	2152	...	$d-3·5$	$f-2·5$	$g-2·5$	$k+0·3$	...	12·3	−·1	+·2	...
Mar. 1	2159	...	$e-2·5$	$f-2·0$	$g-2·0$	$k-0·2$	$l-0·2$	11·9	−·2	+·1	...
Mar. 12	2170	132	$k-0·7$	$l-1·0$	...	...	...	12·0	−·2	+·2	...
Mar. 30	2188	132	$k-1·5$	$l-1·5$	...	...	...	12·7	−·2	+·2	...
Sept. 28	2370	...	$l-1·0$	...	...	...	...	12·4	−·2	0	−·5
Oct. 10	2382	80	$f-4·0$	$g-3·0$	$k-2·0$	$l-1·0$	...	13·2	−·2	+·1	+·9
Oct. 19	2391	80	$f-2·5$	$k-1·5$	$l-1·0$	...	...	12·5	−·2	+·2	+·8
Nov. 6	2409	...	$d-2·5$	$f-1·5$	$g-1·5$	$=k$	$=l$	11·5	−·1	+·1	+·6
Nov. 26	2429	...	$c-1·5$	$d-1·2$	$e-0·5$	$f+0·2$	$g-0·2$	10·2	−·1	+·1	+·1
Dec. 9	2442	...	$c-1·0$	$d-0·5$	$e+0·2$	$f+1·0$	$g-0·3$	9·7	−·1	+·1	0
Dec. 25	2458	...	$c-1·5$	$d-1·0$	$e-0·5$	$f+0·3$	$g+0·3$	10·1	0	+·1	+·5
1893 Jan. 4	2468	...	$d-1·4$	$=f$	$g-0·3$	$k+1·4$	$l+1·4$	10·2	0	+·1	+·4
Jan. 18	2482	80	$e-1·6$	$f-1·3$	$g-1·6$	$k+0·3$	$l+0·3$	11·3	0	+·1	+1·1
Feb. 4	2499	132	$k-1·0$	$l-1·0$	...	...	...	12·2	−·1	+·2	...
Feb. 10	2505	132	$k-2·0$	$l-2·0$	...	...	...	13·2	−·1	+·2	...
Sept. 2	2709	132	$k-2·0$	$l-1·0$	...	...	...	12·7	−·1	+·2	...
Sept. 15	2722	80	$f-2·5$	$g-3·0$	$k-2·0$	$l-2·0$	...	13·1	−·1	+·1	+·8
Oct. 1	2738	...	$d-3·0$	$f-2·0$	$g-2·0$	$k-1·0$	$l-1·0$	12·3	−·1	+·1	+1·1
Oct. 12	2749	...	$d-1·8$	$f-1·2$	$g-1·0$	$k+1·0$	$l+1·0$	10·8	0	+·1	+·2
Oct. 23	2760	...	$c-1·3$	$d-1·0$	$e-0·5$	$f+0·5$	$g-0·5$	10·2	−·1	+·1	−·2
Nov. 6	2774	...	$d-1·0$	$e-0·5$	$f+0·5$	$g-0·5$	$l+2·0$	10·0	0	+·1	−·5
Nov. 20	2788	...	$e-1·0$	$=f$	$g-0·3$	$k+1·0$	$l+1·0$	10·4	0	+·1	−·6
Nov. 26	2794	...	$d-2·3$	$f-1·0$	$g-1·5$	$k+0·5$	$l+0·5$	11·2	0	+·1	0
Dec. 9	2807	...	$d-3·0$	$f-1·3$	$g-2·0$	$k-0·8$	$l-0·5$	11·9	−·1	+·1	...
Dec. 30	2828	132	$f-2·7$	$g-3·0$	$k-2·0$	$l-1·5$	...	13·0	−·1	+·1	...
1894 July 21	3031	132	$k-2·0$	$l-2·0$	...	...	...	13·2	−·1	+·2	+·1
Aug. 20	3061	...	$d-2·3$	$f-1·3$	$g-1·3$	$k-0·3$	$l-0·3$	11·5	−·1	+·1	0
Aug. 29	3070	...	$d-1·3$	$f-0·3$	$g-0·8$	$k+0·5$	$l+0·5$	10·7	0	+·1	+·3
Sept. 6	3078	...	$d-1·2$	$f-0·6$	$g-0·6$	$k+1·0$	$l+1·0$	10·5	0	+·1	+·4
Sept. 19	3091	...	$a-1·5$	$d-1·2$	$e-0·5$	$=f$	$=g$	10·0	−·1	+·1	−·2
Sept. 26	3098	...	$a-1·6$	$c-1·3$	$d-0·8$	$f+0·3$	$g+0·6$	9·8	0	+·1	−·7
Oct. 8	3110	...	$d-1·2$	$f-0·4$	$g-0·2$	$k+1·0$	$l+1·0$	10·4	0	+·1	−·6
Oct. 14	3116	...	$e-1·2$	$f-0·3$	$g-1·2$	$k+0·6$	$l+0·3$	10·9	0	+·1	−·5
Nov. 5	3138	...	$e-2·0$	$f-1·5$	$g-1·5$	$k-1·0$	$l-0·5$	11·8	−·1	+·1	−1·4
Nov. 19	3152	80	$k-1·5$	$l-1·3$	...	...	...	12·6	−·1	+·2	...

1892 April 15. Not seen with 34, 80, 132 on a clear dark sky. Similarly invisible on the following dates: April 27, May 4, June 3, 13, 14, July 11, 22, August 3, 19, September 12.

1893 March 4. Not seen with 34, 80, 132 on the following dates: March 4, 11, 19, April 2, 10, May 4, 13, June 2, 11, July 17, August 8.

1893 August 24. Mag. 13·5. Extreme limit of vision; not seen 34 and 80; only just glimpsed 132.

1894 January 23. Not seen with 34, 80, 132 on this or the following dates: February 13, 27, March 11, 23, April 24, May 6, June 13, 27, July 7.

1894 December 1. Not seen 34 and 80; just caught at intervals with 132; very clear sky. After this looked for but not seen on the following dates: 1895 January 22, February 11, 19, March 7, 22, April 10, May 2.

S CYGNI—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1895 May 22	3336	132	$k-2\cdot5$	$l-2\cdot5$	...	...	...	13·7	−·1	+·2	+ ·5
May 29	3343	132	$k-1\cdot5$	$l-1\cdot0$	...	...	...	12·5	−·1	+·2	− ·4
June 7	3352	...	$d-2\cdot5$	$f-2\cdot0$	$g-2\cdot0$	$k-1\cdot0$	$l-1\cdot0$	12·1	−·1	+·1	− ·5
June 23	3368	...	$d-2\cdot0$	$f-1\cdot3$	$g-1\cdot3$	$k-0\cdot3$	$l-0\cdot3$	11·4	−·1	+·1	− ·2
July 7	3382	...	$d-1\cdot0$	$f-0\cdot4$	$g-0\cdot4$	$k+1\cdot0$	$l+1\cdot0$	10·4	0	+·1	− ·4
Aug. 2	3408	...	$d-0\cdot3$	$f+0\cdot3$	$g+0\cdot6$	$k+1\cdot0$	$l+1\cdot0$	9·9	+·1	+·1	+ ·3
Aug. 12	3418	...	$a-1\cdot5$	$c-1\cdot0$	$d-0\cdot3$	$f+0\cdot6$	$g+1\cdot0$	9·4	0	+·1	− ·3
Aug. 24	3430	...	$d-1\cdot0$	$=f$	$=g$	$k+1\cdot2$	$l+1\cdot2$	10·1	0	+·1	− ·2
Aug. 30	3436	...	$d-1\cdot0$	$f-0\cdot5$	$g-0\cdot5$	$k+1\cdot0$	$l+1\cdot0$	10·4	0	+·1	− ·2
Sept. 18	3455	...	$d-1\cdot5$	$f-1\cdot0$	$g-1\cdot0$	$=k$	$l+0\cdot5$	11·0	0	+·1	− ·4
Sept. 26	3463	...	$d-1\cdot6$	$f-1\cdot0$	$g-1\cdot3$	$k-0\cdot5$	$=l$	11·3	−·1	+·1	− ·5
1896 Apr. 12	3662	132	$f-3\cdot0$	$g-2\cdot0$	$k-0\cdot5$	$l-0\cdot8$	...	12·3	−·1	+·1	− ·9
Apr. 19	3669	132	$f-3\cdot0$	$g-3\cdot0$	$k-1\cdot3$	$l-0\cdot6$	...	12·7	−·1	+·1	− ·3
Apr. 29	3679	80	$e-2\cdot7$	$f-2\cdot0$	$g-1\cdot5$	$k-0\cdot6$	$l-0\cdot6$	12·0	−·1	+·1	− ·2
May 8	3688	...	$d-2\cdot5$	$f-1\cdot7$	$g-1\cdot2$	$k-0\cdot3$	$l-0\cdot3$	11·6	−·1	+·1	− ·1
May 20	3700	...	$d-1\cdot7$	$f-1\cdot2$	$g-1\cdot0$	$k+0\cdot5$	$l+0\cdot3$	11·0	0	+·1	0
May 28	3708	...	$d-1\cdot3$	$f-0\cdot5$	$g-0\cdot5$	$k+1\cdot0$	$l+1\cdot0$	10·5	0	+·1	− ·3
June 11	3722	...	$c-1\cdot0$	$d-1\cdot0$	$e-0\cdot4$	$=f$	$g+0\cdot3$	10·0	−·1	+·1	− ·4
June 21	3732	...	$d-1\cdot0$	$=f$	$g-0\cdot2$	$k+1\cdot3$	$l+1\cdot3$	10·1	0	+·1	− ·2
July 5	3746	...	$d-1\cdot2$	$e-0\cdot7$	$f-0\cdot3$	$=g$	$l+1\cdot0$	10·3	0	+·1	− ·4
July 20	3761	...	$d-1\cdot5$	$f-0\cdot7$	$g-0\cdot7$	$k+0\cdot7$	$l+0\cdot7$	10·7	0	+·1	− ·6
July 30	3771	...	$d-2\cdot0$	$f-1\cdot2$	$g-1\cdot2$	$k-0\cdot5$	$=l$	11·4	−·1	+·1	− ·4
Aug. 12	3784	...	$d-2\cdot3$	$f-1\cdot5$	$g-1\cdot8$	$k-1\cdot2$	$l-1\cdot2$	12·0	−·1	+·1	− ·4
Aug. 26	3798	132	$f-2\cdot5$	$g-3\cdot0$	$k-2\cdot0$	$l-1\cdot5$	...	12·9	−·1	+·1	− ·1
1897 Mar. 28	4012	80	$d-3\cdot5$	$f-2\cdot0$	$g-2\cdot0$	$k-0\cdot5$	$l-0\cdot5$	12·1	−·1	+·1	...
Apr. 10	4025	...	$d-1\cdot8$	$f-0\cdot7$	$g-0\cdot7$	$k+1\cdot0$	$l+1\cdot0$	10·6	0	+·1	− ·2
Apr. 22	4037	...	$a-2\cdot0$	$c-0\cdot8$	$d-0\cdot8$	$f+0\cdot8$	$g+0\cdot8$	9·6	0	+·1	0
May 5	4050	...	$a-2\cdot0$	$c-1\cdot0$	$d-0\cdot8$	$f+1\cdot0$	$g+1\cdot0$	9·6	0	+·1	+ ·2
May 11	4056	...	$c-1\cdot0$	$d-0\cdot5$	$f+1\cdot0$	$g+1\cdot0$	$l+2\cdot0$	9·4	0	+·1	− ·2
May 18	4063	...	$c-1\cdot0$	$d-0\cdot5$	$e-0\cdot3$	$f+0\cdot3$	$g+1\cdot0$	9·7	0	+·1	0
June 2	4078	...	$d-1\cdot0$	$f-0\cdot2$	$g+0\cdot2$	$k+1\cdot5$	$l+1\cdot5$	10·0	0	+·1	− ·2
June 11	4087	...	$d-1\cdot2$	$f-0\cdot2$	$g-0\cdot2$	$k+1\cdot0$	$l+1\cdot0$	10·3	0	+·1	− ·3
July 11	4117	...	$d-2\cdot0$	$f-1\cdot2$	$g-1\cdot2$	$=k$	$=l$	11·3	−·1	+·1	− ·5
July 26	4132	...	$d-3\cdot0$	$f-2\cdot0$	$g-2\cdot0$	$k-1\cdot0$	$l-1\cdot0$	12·2	−·1	+·1	− ·5
1898 Feb. 20	4341	132	$f-3\cdot5$	$g-3\cdot5$	$k-3\cdot0$	$l-2\cdot0$	...	13·7	−·2	+·1	...
Mar. 3	4352	132	$f-2\cdot5$	$g-2\cdot5$	$k-1\cdot5$	$l-1\cdot5$	...	12·7	−·2	+·1	...
Mar. 14	4363	132	$e-3\cdot0$	$f-1\cdot5$	$g-2\cdot0$	$k-1\cdot0$	$l-0\cdot5$	12·1	−·2	+·1	...
Mar. 29	4378	...	$d-2\cdot5$	$f-0\cdot8$	$g-1\cdot2$	$k+1\cdot0$	$l+0\cdot5$	11·0	0	+·1	...
Apr. 8	4388	...	$d-1\cdot0$	$f+0\cdot2$	$=g$	$k+1\cdot0$	$l+1\cdot0$	10·2	+·1	+·1	+ ·4

1895 May 14. With 132 a faint nebulosity can be just perceived in the place of the star, which is probably about to reappear.

1895 October 17. Not seen on this or the following dates: October 27, November 23, December 1, January 9, February 1, 22, March 14, 29.

1896 September 7. Just glimpsed with 132. After this not seen on the following dates: September 27, October 12, 28, November 6, December 9, January 1, 26, February 7, 20.

1897 March 6. Just glimpsed with 132.

1897 August 19. Just glimpsed with 132. After this not seen on the following dates: September 10, October 12, November 19, December 6, 22, February 2, 8.

1898 January 11. Just glimpsed with 132.

S CYGNI—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1898 Apr. 22	4402	...	$d-1\cdot3$	$=f$	$=g$	$k+1\cdot5$	$l+1\cdot5$	10·1	0	+·1	+ ·1
May 4	4414	...	$d-1\cdot3$	$=f$	$=g$	$k+2\cdot0$	$l+2\cdot0$	9·9	+·1	+·1	− ·4
May 11	4421	...	$d-1\cdot5$	$f+0\cdot3$	$g+0\cdot2$	$k+1\cdot5$	$l+1\cdot0$	10·1	+·1	+·1	− ·4
May 23	4433	...	$d-1\cdot3$	$f-1\cdot0$	$g-0\cdot5$	$k+0\cdot7$	$l+1\cdot6$	10·5	0	+·1	− ·7
June 5	4446	...	$d-2\cdot0$	$f-1\cdot2$	$g-0\cdot8$	$=k$	$=l$	11·2	−·1	+ 1	− ·9
June 17	4458	80	$e-3\cdot0$	$f-2\cdot0$	$g-1\cdot7$	$k-1\cdot2$	$l-1\cdot0$	12·3	−·2	+·1	− ·5
1899 Jan. 11	4656	132	$f-3\cdot0$	$g-3\cdot5$	$k-2\cdot5$	$l-2\cdot5$	...	13·6	−·2	+·1	+1·8
Jan. 23	4678	132	$e-4\cdot0$	$f-3\cdot0$	$g-3\cdot0$	$k-1\cdot7$	$l-2\cdot0$	13·2	−·2	+·1	+1·8
Feb. 2	4688	80	$f-2\cdot5$	$g-2\cdot5$	$k-1\cdot2$	$l-1\cdot2$	...	12·6	−·2	+·1	+1·5
Feb. 16	4702	...	$d-2\cdot0$	$f-0\cdot3$	$g-0\cdot8$	$k+1\cdot0$	$l+1\cdot0$	10·6	0	+·1	+ ·1
Feb. 24	4710	...	$d-1\cdot3$	$f-0\cdot2$	$g-0\cdot5$	$k+1\cdot2$	$l+1\cdot2$	10·3	0	+·1	0
Mar. 4	4718	...	$d-1\cdot5$	$f-0\cdot2$	$g-0\cdot2$	$k+1\cdot3$	$l+1\cdot7$	10·2	0	+·1	+ ·1
Mar. 14	4728	...	$e-2\cdot0$	$d-1\cdot5$	$e-1\cdot0$	$=f$	$g-0\cdot2$	10·5	−·2	+·1	...
Mar. 20	4734	...	$d-1\cdot7$	$f-0\cdot5$	$g-0\cdot5$	$k+1\cdot0$	$l+1\cdot0$	10·5	0	+·1	...
Apr. 7	4752	...	$d-2\cdot5$	$f-1\cdot3$	$g-1\cdot3$	$=k$	$l+0\cdot5$	11·3	−·1	+·1	...
Apr. 19	4764	...	$d-2\cdot5$	$f-1\cdot5$	$g-1\cdot0$	$k-0\cdot2$	$l-0\cdot2$	11·5	−·2	+·1	...
May 2	4777	80	$d-3\cdot0$	$f-2\cdot0$	$g-2\cdot0$	$k-1\cdot0$	$l-0\cdot2$	12·0	−·2	+·1	...
Nov. 10	4969	132	$e-4\cdot0$	$f-3\cdot0$	$g-4\cdot0$	$k-2\cdot0$	$l-2\cdot0$	13·5	−·2	+·1	+ ·4
Nov. 26	4985	80	$f-1\cdot8$	$g-2\cdot7$	$k-1\cdot5$	$l-1\cdot0$	...	12·5	−·2	+·1	+ ·7
Dec. 9	4998	...	$d-2\cdot0$	$f-1\cdot2$	$g-1\cdot4$	$=k$	$=l$	11·3	−·1	+·1	+ ·3
Dec. 25	5014	...	$d-1\cdot5$	$=f$	$g-0\cdot5$	$k+1\cdot0$	$l+1\cdot0$	10·4	0	+·1	...
1900 Jan. 5	5025	...	$c-1\cdot5$	$d-1\cdot0$	$e-0\cdot3$	$f+1\cdot0$	$g+0\cdot7$	9·8	−·1	+·1	...
Jan. 16	5036	...	$c-1\cdot2$	$d-1\cdot0$	$e-0\cdot2$	$f+1\cdot5$	$g+1\cdot0$	9·6	−·1	+·1	...
Jan. 24	5044	...	$c-1\cdot2$	$d-1\cdot0$	$e-0\cdot2$	$f+1\cdot0$	$g+0\cdot6$	9·8	−·1	+·1	...
Feb. 1	5052	...	$c-1\cdot0$	$d-1\cdot7$	$e-0\cdot2$	$f+1\cdot0$	$g+1\cdot0$	9·8	−·1	+·1	...
Feb. 17	5068	...	$d-2\cdot0$	$=f$	$g-0\cdot5$	$k+1\cdot0$	$l+1\cdot0$	10·4	0	+·1	G.M.T. h m
Mar. 16	5095	...	$e-1\cdot9$	$f-1\cdot6$	$g-1\cdot3$	$k-0\cdot3$	$l-0\cdot3$	11·5	−·2	+·1	7 50
Oct. 17	5310	132	$k-2\cdot0$	$l-1\cdot0$	...	...	...	12·8	−·2	+·2	7 20
Oct. 26	5319	132	$f-3\cdot0$	$g-3\cdot5$	$k-2\cdot0$	$l-2\cdot0$	...	13·3	−·2	+·1	9 50
Nov. 22	5346	80	$d-3\cdot0$	$f-1\cdot5$	$g-2\cdot0$	$k-0\cdot5$	$l-0\cdot8$	12·0	−·2	+·1	9 50
Nov. 29	5353	...	$e-2\cdot5$	$f-1\cdot5$	$g-2\cdot0$	$k-1\cdot0$	$l-1\cdot0$	12·0	−·2	+·1	8 0
Dec. 15	5369	...	$e-1\cdot3$	$f-0\cdot7$	$g-0\cdot5$	$k+0\cdot6$	$l+0\cdot6$	10·7	0	+·1	7 0

1898 July 2. Not seen on this or the following dates: July 28, August 25, September 16, October 23, November 18, December 13, 19, 28, January 5.

1899 May 28. Not seen on this or the following dates: July 1, August 8, September 26, October 7, 17.

1900 April 13. 9.40 G.M.T. Barely seen 132; limit of vision. After this not seen on the following dates: April 16, May 22, June 21, July 14, August 16, September 4, 11, 21, October 3.

1900 November 13. 10.0 G.M.T. Variable certainly gone down again after a transient rise. Not seen 34, 80, 132. Comparison stars *k* and *l* distinct.

T CEPHEI.

R. A. $21^h\ 8^m\ 13^s$. Dec. $+68°\ 5'{\cdot}0$ (1900·0).

Date.	Julian Day. 2	Power.	Comparisons.					Deduced Magnitude.	Corrections. Scale.	Corrections. Stars.	Apparent Correction to Harvard.
1891 Dec. 2	2069	...	$h-1{\cdot}6$	$l-1{\cdot}0$	$m-1{\cdot}0$	$n-0{\cdot}6$	$p-0{\cdot}6$	10·7	−·2	−·2	+·7
Dec. 20	2087	...	$f-1{\cdot}5$	$g-1{\cdot}3$	$h-1{\cdot}5$	$l-1{\cdot}0$	$=n$	9·8	−·2	0	−·5
1892 Feb. 1	2130	...	$h-1{\cdot}5$	$l-0{\cdot}5$	$m-0{\cdot}3$	$n+0{\cdot}7$	$p+1{\cdot}0$	9·8	−·1	−·2	−·6
Feb. 23	2152	...	$h-1{\cdot}5$	$l+0{\cdot}5$	$m+1{\cdot}5$	$n+1{\cdot}5$	$p+2{\cdot}0$	8·9	+·2	−·2	−·5
Mar. 5	2163	...	$d-2{\cdot}0$	$h-1{\cdot}0$	$l+1{\cdot}0$	$m+1{\cdot}5$	$n+1{\cdot}5$	8·6	+·1	−·1	−·3
Mar. 12	2170	...	$d-2{\cdot}0$	$g+1{\cdot}0$	$=h$	$l+1{\cdot}3$	$m+1{\cdot}6$	8·0	+·1	−·1	−·6
Mar. 29	2187	...	$d-1{\cdot}2$	$f+1{\cdot}0$	$g+1{\cdot}7$	$h+1{\cdot}0$	$l+2{\cdot}0$	7·1	+·2	+·1	−·6
Apr. 5	2194	...	$d-1{\cdot}2$	$f+1{\cdot}7$	$g+1{\cdot}0$	$h+1{\cdot}0$	$l+1{\cdot}7$	7·2	+·2	+·1	−·3
Apr. 16	2205	...	$d-1{\cdot}0$	$f+0{\cdot}7$	$g+1{\cdot}0$	$h+1{\cdot}0$	$l+1{\cdot}3$	7·4	+·2	+·1	0
Apr. 27	2216	...	$d-1{\cdot}5$	$f+1{\cdot}0$	$g+1{\cdot}5$	$h+1{\cdot}0$	$l+2{\cdot}0$	7·2	+·2	+·1	0
May 24	2243	...	$d-1{\cdot}5$	$f+1{\cdot}0$	$g+1{\cdot}5$	$h+1{\cdot}3$	$l+2{\cdot}0$	7·1	+·2	+·1	0
June 2	2252	...	$d-1{\cdot}0$	$f+1{\cdot}5$	$g+1{\cdot}5$	$h+1{\cdot}3$	$l+2{\cdot}0$	6·9	+·2	+·1	0
June 8	2258	...	$=d$	$f+1{\cdot}3$	$g+1{\cdot}7$	$h+1{\cdot}0$	$l+2{\cdot}0$	6·8	+·2	+·1	0
June 15	2265	...	$d+0{\cdot}6$	$f+1{\cdot}5$	$g+2{\cdot}5$	$h+1{\cdot}5$	$l+2{\cdot}5$	6·3	+·3	+·1	−·2
June 23	2273	...	$d-0{\cdot}5$	$f+1{\cdot}5$	$g+1{\cdot}5$	$h+1{\cdot}0$	$l+2{\cdot}0$	6·9	+·2	+·1	+·5
June 29	2279	...	$d+1{\cdot}4$	$f+1{\cdot}5$	$g+2{\cdot}0$	$h+2{\cdot}0$	$l+2{\cdot}5$	6·1	+·3	+·1	−·1
July 8	2288	...	$d+1{\cdot}0$	$g+2{\cdot}0$	$h+1{\cdot}6$	$l+2{\cdot}3$	$n+3{\cdot}0$	6·5	+·3	0	+·3
July 20	2300	...	$d+1{\cdot}5$	$g+2{\cdot}0$	$h+2{\cdot}0$	$l+3{\cdot}0$	$m+3{\cdot}0$	6·1	+·3	−·1	−·1
Aug. 3	2314	...	$d+2{\cdot}0$	$g+3{\cdot}0$	$h+2{\cdot}5$	$l+3{\cdot}0$	$n+3{\cdot}5$	5·7	+·3	0	−·4
Aug. 19	2330	...	$d+2{\cdot}0$	$g+3{\cdot}0$	$h+2{\cdot}5$	$l+3{\cdot}0$	$n+4{\cdot}0$	5·6	+·3	0	−·5
Sept. 2	2344	...	$d+1{\cdot}0$	$f+1{\cdot}5$	$g+2{\cdot}0$	$h+1{\cdot}5$	$l+2{\cdot}0$	6·4	+·3	+·1	+·3
Sept. 13	2355	...	$=d$	$g+1{\cdot}5$	$h+1{\cdot}0$	$l+2{\cdot}0$	$n+3{\cdot}0$	7·0	+·2	0	+·5
Oct. 7	2379	...	$d-1{\cdot}0$	$f+1{\cdot}0$	$g+1{\cdot}3$	$h+0{\cdot}5$	$l+1{\cdot}0$	7·4	+·2	+·1	+·3
Oct. 18	2390	...	$d-0{\cdot}5$ $n+1{\cdot}7$	$f+0{\cdot}5$	$g+0{\cdot}5$	$h+0{\cdot}5$	$m+1{\cdot}3$	7·7	+·2	0	+·1
Nov. 6	2409	...	$=g$	$h-1{\cdot}0$	$=l$	$m+1{\cdot}5$	$n+2{\cdot}0$	8·6	+·1	−·2	+·2
Dec. 6	2439	...	$h-1{\cdot}5$	$l-0{\cdot}2$	$m+0{\cdot}6$	$n+1{\cdot}3$	$r+1{\cdot}5$	9·5	+·1	−·2	+·3
Dec. 25	2458	...	$l-1{\cdot}0$	$=m$	$n+0{\cdot}7$	$q+2{\cdot}0$	$r+1{\cdot}3$	9·9	+·1	−·2	+·2
1893 Jan. 10	2474	...	$h-2{\cdot}0$	$l-1{\cdot}0$	$m-0{\cdot}7$	$n+0{\cdot}2$	$r+1{\cdot}3$	10·2	0	−·2	+·1
Jan. 24	2488	...	$d-2{\cdot}0$	$h-1{\cdot}5$	$l-0{\cdot}6$	$m-1{\cdot}3$	$n-0{\cdot}3$	9·9	−·2	−·1	−·5
Feb. 4	2499	...	$l-1{\cdot}5$	$m-1{\cdot}0$	$=n$	$r+0{\cdot}5$	...	10·7	0	−·2	+·5
Feb. 10	2505	...	$g-1{\cdot}5$	$h-2{\cdot}0$	$l-1{\cdot}0$	$m-0{\cdot}5$	$n-0{\cdot}5$	10·2	−·1	−·2	+·1
Mar. 5	2528	...	$g-1{\cdot}0$	$h-1{\cdot}0$	$l+0{\cdot}3$	$m+0{\cdot}3$	$n+0{\cdot}7$	9·2	0	−·2	−·2
Mar. 12	2535	...	$d-2{\cdot}0$	$h-1{\cdot}0$	$l-0{\cdot}3$	$m+0{\cdot}6$	$n+1{\cdot}0$	9·1	0	−·1	0
Mar. 21	2544	...	$d-2{\cdot}0$	$h-1{\cdot}0$	$=l$	$m+1{\cdot}0$	$n+1{\cdot}3$	8·9	0	−·1	+·1
Apr. 2	2556	...	$d-2{\cdot}0$	$h-1{\cdot}0$	$=l$	$m+1{\cdot}0$	$n+2{\cdot}0$	8·8	0	−·1	+·2
Apr. 10	2564	...	$d-1{\cdot}5$	$h-0{\cdot}5$	$l+0{\cdot}5$	$m+1{\cdot}3$	$n+1{\cdot}7$	8·5	0	−·1	+·1
Apr. 28	2582	...	$d-1{\cdot}0$	$=f$	$g+0{\cdot}7$	$=h$	$l+1{\cdot}0$	7·9	0	+·1	+·1
May 11	2595	...	$d-1{\cdot}3$	$f+0{\cdot}5$	$g+1{\cdot}0$	$h+0{\cdot}5$	$l+1{\cdot}5$	7·6	+·1	+·1	+·2
May 25	2609	...	$d-1{\cdot}3$	$=f$	$g+0{\cdot}5$	$h+1{\cdot}0$	$l+1{\cdot}5$	7·7	+·1	+·1	+·6
June 7	2622	...	$d-1{\cdot}0$	$f+0{\cdot}6$	$g+1{\cdot}0$	$h+0{\cdot}6$	$l+1{\cdot}5$	7·5	+·1	+·1	(+·8)
June 12	2627	..	d 0·7	$f+0{\cdot}7$	$g+0{\cdot}7$	$h+0{\cdot}7$	$l+2{\cdot}0$	7·3	+·1	+·1	(+·7)

T CEPHEI—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1893 June 29	2644	...	$d-0.5$	$f+1.0$	$g+2.0$	$h+1.0$	$l+2.0$	6.9	+.1	+.1	(+ .6)
July 24	2669	...	$d+1.5$	$f+2.3$	$g+2.3$	$h+2.3$	$l+3.0$	5.7	+.2	+.1	(+ .2)
July 28	2673	...	$d+1.2$	$f+2.0$	$g+2.5$	$h+2.0$	$l+3.0$	5.9	+.2	+.1	(+ .5)
Aug. 5	2681	...	$d+1.0$	$f+2.5$	$g+3.0$	$h+2.0$	$l+3.0$	5.7	+.2	+.1	(+ .4)
Aug. 13	2689	...	$d+1.5$	$h+2.3$	$l+3.5$	$m+3.5$	$n+4.0$	5.8	+.2	−.1	(+ .5)
Aug. 21	2697	...	$d+1.5$	$h+2.0$	$l+3.0$	$m+3.5$	$n+4.0$	6.0	+.2	−.1	+ .8
Aug. 28	2704	...	$d+1.3$	$h+2.0$	$l+3.0$	$m+3.5$	$n+4.0$	6.0	+.2	−.1	+ .7
Sept. 7	2714	...	$d+2.0$	$f+2.5$	$g+3.0$	$h+2.5$	$l+3.5$	5.3	+.2	+.1	0
Sept. 15	2722	...	$d+0.6$	$h+1.3$	$l+2.0$	$m+2.3$	$n+2.6$	7.0	+.2	−.1	+1.3
Oct. 12	2749	...	$d+0.2$	$f+1.0$	$g+1.5$	$h+1.0$	$l+2.0$	6.9	+.2	+.1	+ .5
Oct. 23	2760	...	$d-1.0$	$f+1.0$	$g+1.0$	$h+0.3$	$l+1.5$	7.4	+.1	+.1	+ .5
Nov. 7	2775	...	$d-1.3$, $n+2.0$	$g+1.0$	$h-0.2$	$l+1.0$	$m+1.6$	8.0	+.1	−.1	+ .4
Dec. 3	2801	...	$d-1.5$	$h-0.5$	$l+1.0$	$m+1.0$	$n+2.0$	8.4	0	−.1	0
Dec. 14	2812	...	$d-1.5$, $n+1.5$	$g-1.0$	$h-1.0$	$=l$	$m+1.0$	8.9	0	−.1	+ .2
1894 Jan. 20	2849	...	$g-1.0$	$h-1.5$	$l-0.3$	$m+0.3$	$n+1.0$	9.4	0	−.2	− .4
Jan. 30	2859	...	$g-1.0$	$h-1.5$	$l-0.9$	$m-0.5$	$n+0.3$	9.8	−.1	−.2	− .4
Feb. 13	2873	...	$g-1.0$	$h-1.5$	$l-0.5$	$m+0.2$	$n+1.2$	9.4	0	−.2	−1.0
Feb. 27	2887	...	$g-0.5$	$h-1.3$	$l-0.3$	$m-0.7$	$n+0.3$	9.6	−.1	−.2	− .8
Mar. 8	2896	...	$d-1.5$	$h-1.3$	$l-0.2$	$m+0.5$	$n+1.0$	9.1	0	−.1	− .9
Mar. 19	2907	...	$d-1.5$	$h-1.0$	$=l$	$m+1.0$	$n+1.5$	8.8	0	−.1	− .9
Mar. 27	2915	...	$=g$	$h-1.0$	$=l$	$m+1.0$	$n+1.5$	8.8	0	−.2	− .8
Apr. 25	2944	...	$d-1.3$	$h-0.3$	$l+0.7$	$m+1.0$	$n+1.5$	8.4	0	−.1	− .1
May 18	2967	...	$d-1.3$	$h+0.6$	$l+1.0$	$m+1.5$	$n+2.0$	8.0	+.1	−.1	− .1
May 26	2975	...	$d-1.3$	$h+0.6$	$l+1.3$	$m+1.5$	$n+2.0$	8.0	+.1	−.1	+ .1
June 13	2993	...	$d-1.0$	$f+2.0$	$g+1.5$	$h+1.0$	$l+1.5$	7.0	+.1	+.1	− .5
June 27	3007	...	$d-0.3$	$f+1.0$	$g+1.5$	$h+1.0$	$l+2.0$	7.0	+.1	+.1	− .3
July 7	3017	...	$d-0.5$	$h+1.0$	$l+1.5$	$m+1.5$	$n+1.5$	7.8	+.1	−.1	+ .5
July 27	3037	...	$=d$	$h+1.0$	$l+1.5$	$m+1.5$	$n+2.0$	7.6	+.2	−.1	+1.0
Aug. 27	3068	...	$d+1.0$	$f+2.5$	$g+2.5$	$h+2.0$	$l+2.5$	5.9	+.2	+.1	+ .8
Sept. 6	3078	...	$d+1.5$	$f+1.5$	$g+2.0$	$h+1.5$	$l+2.0$	6.3	+.2	+.1	+1.3
Sept. 19	3091	...	$d+1.0$	$h+2.0$	$l+3.0$	$m+3.0$	$n+3.3$	6.3	+.2	−.1	+ .9
Oct. 14	3116	...	$d+1.3$	$f+1.5$	$g+1.5$	$h+1.5$	$l+2.0$	6.4	+.2	+.1	+ .7
Nov. 16	3149	...	$d-1.0$	$h+0.5$	$l+1.3$	$m+1.3$	$n+2.0$	8.0	+.1	−.1	+1.2
Nov. 30	3163	...	$d-1.0$	$h+0.5$	$l+1.0$	$m+1.0$	$n+1.5$	8.2	+.1	−.1	+ .9
Dec. 8	3171	...	$d-1.3$	$h+0.3$	$l+1.2$	$m+1.2$	$n+1.5$	8.2	+.1	−.1	+ .7
Dec. 31	3194	...	$d-1.5$	$h-0.3$	$l+0.5$	$m+0.8$	$n+1.3$	8.6	0	−.1	+ .2
1895 Jan. 22	3216	...	$d-1.7$	$h-1.0$	$l+0.2$	$m+0.5$	$n+1.0$	9.0	0	−.1	− .3
Feb. 5	3230	...	$d-2.0$	$h-1.3$	$l-0.5$	$m+0.3$	$n+0.6$	9.4	0	−.1	− .4
Feb. 19	3244	...	$h-2.5$	$l-1.0$	$m-0.5$	$n+0.5$	...	10.2	0	−.2	+ .1
Mar. 4	3257	...	$g-1.0$	$h-2.0$	$l-1.0$	$m-0.7$	$n+0.3$	10.0	−.1	−.2	− .4
Mar. 21	3274	...	$l-2.0$	$m-1.0$	$n-0.5$	$p-1.0$	...	11.1	−.1	−.2	+ .8
Apr. 11	3295	...	$g-1.0$	$h-2.0$	$l-1.0$	$m+0.3$	$n+1.0$	9.6	0	−.2	− .2
May 2	3316	...	$d-2.0$	$=h$	$l+0.8$	$m+0.8$	$n+1.3$	8.6	+.1	−.1	− .7
May 16	3330	...	$d-1.0$	$g+0.3$	$h+0.5$	$l+1.0$	$m+1.0$	8.0	+.1	−.1	−1.0
June 5	3350	...	$d-1.5$	$h+1.0$	$l+1.5$	$m+1.0$	$n+1.5$	8.1	+.1	−.1	− .6

T Cephei—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1895 June 27	3372	...	$d-1\cdot3$	$f-0\cdot3$	$g+0\cdot3$	$h+0\cdot8$	$l+1\cdot5$	7·8	0	+·1	−·5
Aug. 3	3409	...	$d-0\cdot8$	$h+1\cdot0$	$l+2\cdot0$	$m+1\cdot3$	$n+2\cdot0$	7·7	+·1	−·1	+·1
Aug. 17	3423	...	$d-0\cdot5$	$h+1\cdot3$	$l+1\cdot6$	$m+1\cdot6$	$n+2\cdot0$	7·6	+·1	−·1	+·4
Aug. 31	3437	...	$d-0\cdot3$	$h+1\cdot3$	$l+2\cdot0$	$m+1\cdot3$	$n+2\cdot0$	7·5	+·1	−·1	+·6
Sept. 18	3455	...	$d+0\cdot6$	$g+1\cdot3$	$h+1\cdot5$	$l+2\cdot0$	$n+2\cdot0$	7·0	+·2	0	+·6
Sept. 26	3463	...	$d+1\cdot0$	$h+2\cdot0$	$l+2\cdot5$	$m+2\cdot0$	$n+2\cdot5$	6·8	+·2	−·1	+·5
Oct. 10	3477	...	$d+1\cdot0$	$h+1\cdot5$	$l+2\cdot5$	$m+1\cdot5$	$n+2\cdot5$	7·0	+·2	−·1	+·8
Oct. 17	3484	...	$d+1\cdot0$	$f+1\cdot3$	$g+1\cdot3$	$h+1\cdot5$	$l+2\cdot3$	6·5	+·2	+·1	+·5
Oct. 23	3490	...	$d+1\cdot0$	$h+2\cdot0$	$l+2\cdot5$	$m+2\cdot5$	$n+3\cdot0$	6·6	+·2	−·1	+·4
Nov. 1	3499	...	$d+1\cdot0$	$h+2\cdot0$	$l+3\cdot0$	$m+2\cdot5$	$n+3\cdot0$	6·5	+·2	−·1	+·1
Nov. 13	3511	...	$d+1\cdot0$	$f+1\cdot5$	$g+1\cdot5$	$h+2\cdot0$	$l+3\cdot0$	6·2	+·2	+·1	−·3
Nov. 30	3528	...	$d-0\cdot7$	$h+0\cdot7$	$l+1\cdot3$	$m+1\cdot3$	$n+1\cdot6$	8·0	+·1	−·1	+·7
Dec. 10	3538	...	$d-1\cdot5$	$h+1\cdot0$	$l+2\cdot0$	$m+1\cdot3$	$n+2\cdot0$	7·8	+·1	−·1	+·2
1896 Jan. 15	3574	...	$d-1\cdot3$	$h-0\cdot7$	$l+0\cdot5$	$m+0\cdot7$	$n+1\cdot3$	8·7	0	−·1	−·1
Feb. 1	3591	...	$d-1\cdot5$	$h+0\cdot8$	$l+1\cdot3$	$m+0\cdot8$	$n+1\cdot3$	8·3	+·1	−·1	−·9
Feb. 22	3612	...	$d-2\cdot5$	$g-1\cdot0$	$h-1\cdot0$	$m+0\cdot3$	$n+0\cdot6$	9·3	0	−·1	−·5:
Mar. 16	3635	...	$g-2\cdot0$	$h-2\cdot0$	$l-1\cdot0$	$m-1\cdot0$	$=n$	10·3	−·1	−·2	−·1
Mar. 29	3648	...	$d-2\cdot0$	$h-1\cdot0$	$=l$	$m-1\cdot0$	$=n$	9·6	−·1	−·1	−·8
Apr. 12	3662	...	$d-2\cdot3$	$h-1\cdot3$	$l+0\cdot2$	$m-1\cdot0$	$=n$	9·7	−·1	−·1	−·7
Apr. 21	3671	...	$d-2\cdot5$	$h-0\cdot8$	$=l$	$m-1\cdot0$	$n-0\cdot2$	9·7	−·2	−·1	−·8
May 3	3683	...	$g-1\cdot4$	$h-0\cdot5$	$l+0\cdot5$	$=m$	$n+0\cdot5$	9·3	0	−·2	−·9
May 12	3692	...	$d-1\cdot5$	$h-0\cdot5$	$l+0\cdot5$	$=m$	$n+0\cdot5$	9·0	0	−·1	−·8
May 31	3711	...	$g-0\cdot6$	$h+0\cdot7$	$l+1\cdot3$	$m+0\cdot7$	$n+1\cdot3$	8·4	+·1	−·2	−1·0
June 19	3730	...	$d-1\cdot3$	$h+1\cdot0$	$l+1\cdot4$	$m+1\cdot0$	$n+1\cdot4$	8·1	+·1	−·1	−·7
July 7	3748	...	$d-1\cdot3$	$f-0\cdot4$	$=g$	$m+1\cdot3$	$n+1\cdot6$	8·3	0	0	−·1
July 26	3767	...	$d-1\cdot0$	$f+0\cdot5$	$g+0\cdot5$	$m+1\cdot3$	$n+1\cdot6$	7·9	+·1	0	−·3
Aug. 13	3785	...	$d-1\cdot3$	$f+0\cdot5$	$g+0\cdot7$	$m+1\cdot2$	$n+1\cdot6$	8·0	+·1	0	0
Sept. 10	3813	...	$d-1\cdot0$	$f+1\cdot0$	$g+1\cdot2$	$m+1\cdot5$	$n+2\cdot0$	7·6	+·1	0	+·2
Sept. 27	3830	...	$d+1\cdot3$	$g+2\cdot0$	$l+3\cdot0$	$m+3\cdot0$	$n+4\cdot0$	6·1	+·2	−·1	−·6
Oct. 12	3845	...	$d+1\cdot0$	$f+1\cdot0$	$g+1\cdot6$	$m+2\cdot0$	$n+3\cdot0$	6·8	+·2	0	+·7
Oct. 28	3861	...	$=d$	$f+1\cdot5$	$g+1\cdot5$	$m+2\cdot0$	$n+2\cdot5$	7·0	+·2	0	+1·0
Nov. 12	3876	...	$d+0\cdot3$	$f+1\cdot3$	$g+1\cdot3$	$m+1\cdot7$	$n+2\cdot3$	7·1	+·2	0	+1·0
Dec. 9	3903	...	$d-0\cdot5$	$f+1\cdot0$	$g+1\cdot0$	$m+1\cdot5$	$n+2\cdot0$	7·5	+·1	0	+·8
1897 Jan. 1	3926	...	$d-1\cdot0$	$f+0\cdot5$	$g+1\cdot0$	$m+1\cdot3$	$n+1\cdot8$	7·8	+·1	0	+·6
Jan. 26	3951	...	$d-2\cdot0$	$f-0\cdot5$	$g+0\cdot3$	$m+1\cdot0$	$n+1\cdot7$	8·4	0	0	+·4
Feb. 14	3970	...	$f-1\cdot3$	$g-0\cdot6$	$m+0\cdot8$	$n+1\cdot6$	$q+2\cdot5$	8·9	0	−·1	+·1
Mar. 13	3997	...	$d-1\cdot5$	$g-1\cdot0$	$=m$	$n+0\cdot8$	...	9·1	0	−·1	−·4
Apr. 23	4038	...	$d-3\cdot0$	$f-1\cdot7$	$g-1\cdot7$	$m-1\cdot0$	$n-0\cdot2$	10·0	−·1	0	−·3
May 11	4056	...	$g-1\cdot4$	$h-1\cdot2$	$=l$	$m-0\cdot7$	$n-0\cdot3$	9·8	−·2	−·2	−·8
May 18	4063	...	$d-2\cdot5$	$f-1\cdot5$	$g-1\cdot3$	$m-0\cdot6$	$n-0\cdot3$	9·7	−·2	0	−·7
June 4	4080	...	$d-2\cdot3$	$f-1\cdot4$	$g-1\cdot0$	$=m$	$n+0\cdot7$	9·3	−·1	0	−·7
June 16	4092	...	$d-2\cdot3$	$f-1\cdot3$	$g-1\cdot0$	$m+0\cdot5$	$n+1\cdot0$	9·1	0	0	−·5
July 15	4121	...	$d-1\cdot3$	$=f$	$g+0\cdot5$	$m+1\cdot3$	$n+1\cdot3$	8·1	+·1	0	−·7
Aug. 3	4140	...	$d-1\cdot3$	$f-0\cdot3$	$g+0\cdot3$	$m+1\cdot0$	$n+1\cdot7$	8·2	0	0	−·3
Sept. 10	4178	...	$d-1\cdot0$	$f+0\cdot5$	$g+1\cdot0$	$m+1\cdot3$	$n+1\cdot8$	7·8	+·1	0	+·3
Sept 30	4198	...	$d-0\cdot5$	$f-1\cdot0$	$g-1\cdot5$	$m+1\cdot8$	$n+2\cdot3$	8·3	0	0	+1·2

T Cephei—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard
									Scale.	Stars.	
1897 Oct. 21	4219	...	$d+0.3$	$f+1.0$	$g+1.5$	$m+2.0$	$n+3.0$	6·9	+·2	0	+·6
Oct. 27	4225	...	$d+1.0$	$f+1.5$	$g+2.0$	$m+2.5$	$n+3.0$	6·5	+·2	0	+·3
Nov. 6	4235	...	$d+1.3$	$f+2.0$	$g+2.0$	$m+2.5$	$n+3.5$	6·2	+·2	0	+·2
Nov. 19	4248	...	$d+1.3$	$f+2.0$	$g+2.0$	$m+2.5$	$n+3.0$	6·3	+·2	0	+·4
Nov. 29	4258	...	$d+0.5$	$f+1.5$	$g+2.0$	$m+2.8$	$n+3.3$	6·5	+·2	0	+·8
Dec. 11	4270	...	$d-0.3$	$f+1.0$	$g+1.3$	$m+1.7$	$n+2.3$	7·3	+·1	0	+1·3
Dec. 22	4281	...	$d+1.0$	$f+2.0$	$g+2.0$	$m+2.5$	$n+3.0$	6·4	+·2	0	+·3
1898 Feb. 5	4326	...	$d-1.2$	$f+1.0$	$g+1.0$	$m+1.5$	$n+2.0$	7·6	+·2	0	+1·0
Feb. 20	4341	...	$d-1.2$	$f+1.0$	$g+1.3$	$m+1.3$	$n+2.0$	7·6	+·2	0	+·6
Mar. 7	4356	...	$d-1.0$	$f+0.5$	$g+1.0$	$m+1.3$	$n+1.7$	7·8	+·2	0	+·3
Mar. 14	4363	...	$d-1.5$	$=f$	$g+0.3$	$m+1.3$	$n+2.0$	8·1	+·1	0	+·3
Apr. 4	4384	...	$d-1.5$	$f-1.3$	$g-0.3$	$m+1.3$	$n+1.6$	8·5	−·1	0	−·2
Apr. 22	4402	...	$d-2.0$	$f-1.2$	$g-0.5$	$m+1.2$	$n+1.5$	8·7	−·1	0	−·4
May 23	4433	...	$d-2.7$	$f-1.7$	$g-1.0$	$m+0.5$	$n+1.0$	9·3	−·1	0	−·1
June 10	4451	...	$d-2.3$	$f-1.0$	$g-1.0$	$m+0.7$	$n+0.7$	9·1	−·1	0	−·2
June 22	4463	...	$d-2.3$	$f-1.3$	$g-1.0$	$m+1.0$	$n+1.3$	9·0	−·1	0	−·2
July 5	4476	...	$d-2.0$	$f-1.2$	$g-0.7$	$m+1.3$	$n+1.6$	8·7	−·1	0	−·1
July 16	4487	...	$d-1.5$	$f-0.7$	$g+0.3$	$m+1.7$	$n+2.3$	8·1	+·1	0	−·3
Aug. 24	4526	...	$d-1.0$	$f+1.4$	$g+1.4$	$m+2.4$	$n+3.0$	7·1	+·2	0	−·3
Sept. 10	4543	...	$d+1.0$	$f+1.5$	$g+2.0$	$m+2.5$	$n+3.0$	6·5	+·3	0	−·2
Sept. 23	4556	...	$d+0.6$	$f+1.5$	$g+1.7$	$m+2.0$	$n+2.5$	6·8	+·3	0	+·3
Oct. 3	4566	...	$d+1.2$	$f+2.0$	$g+2.0$	$m+2.5$	$n+3.0$	6·4	+·3	0	+·2
Oct. 31	4594	...	$d+1.5$	$f+2.0$	$g+2.0$	$m+2.5$	$n+3.0$	6·3	+·3	0	+·8
Nov. 21	4615	...	$d+1.7$	$f+2.4$	$g+2.7$	$m+3.0$	$n+4.0$	5·7	+·3	0	(+·4)
Dec. 7	4631	...	$d+1.5$	$f+2.3$	$g+2.3$	$m+3.5$	$n+4.0$	5·8	+·3	0	(+·4)
Dec. 13	4637	...	$d+1.3$	$f+2.0$	$g+2.3$	$m+3.0$	$n+4.0$	6·0	+·3	0	(+·6)
Dec. 19	4643	...	$d+1.5$	$f+2.0$	$g+2.0$	$m+3.0$	$n+4.0$	6·0	+·3	0	(+·5)
Dec. 28	4652	...	$d+2.0$	$f+2.5$	$g+3.0$	$m+3.5$	$n+4.0$	5·5	+·3	0	(−·3)
1899 Jan. 22	4677	...	$d+1.0$	$f+2.0$	$g+2.0$	$m+3.0$	$n+3.3$	6·2	+·3	0	+·1
Jan. 28	4683	...	$d+1.0$	$f+2.0$	$g+2.0$	$m+3.0$	$n+3.5$	6·2	+·3	0	+·1
Feb. 16	4702	...	$d-1.0$	$f+1.2$	$g+1.6$	$m+2.5$	$n+3.0$	7·1	+·2	0	+1·0
Feb. 22	4708	...	$d-1.0$	$f+1.0$	$g+1.0$	$m+2.3$	$n+3.0$	7·2	+·2	0	+1·1
Feb. 28	4714	...	$d-1.0$	$f+1.0$	$g+1.3$	$m+2.0$	$n+3.0$	7·4	+·2	0	+1·3
Mar. 10	4724	...	$d-1.5$	$=f$	$g+1.0$	$m+1.5$	$n+2.0$	7·9	+·1	0	+1·5
Mar. 17	4731	...	$d-1.3$	$=f$	$g+1.0$	$m+1.7$	$n+2.0$	7·8	+·1	0	+1·0
Mar. 24	4738	...	$d-1.3$	$f+0.3$	$g+1.0$	$m+1.5$	$n+2.0$	7·8	+·2	0	+·6
Apr. 19	4764	...	$d-1.5$	$f-1.0$	$=g$	$m+1.5$	$n+2.0$	8·3	0	0	−·2
May 2	4777	...	$d-2.5$	$f-1.5$	$g-1.0$	$m+1.0$	$n+1.6$	9·0	−·1	0	−·2
June 3	4809	...	$d-2.5$	$f-1.5$	$g-1.0$	$m-0.5$	$n+0.5$	9·5	−·2	0	−·4
June 10	4816	...	$d-2.5$	$f-1.5$	$g-1.3$	$m+1.3$	$n+0.6$	9·2	−·1	0	−·6
June 29	4835	...	$d-2.5$	$f-2.0$	$g-1.0$	$m+0.5$	$n+1.0$	9·2	−·1	0	−·5
July 16	4852	...	$d-2.0$	$f-1.0$	$g-1.0$	$m+1.0$	$n+1.5$	8·8	−·1	0	−·7
July 28	4864	...	$d-2.5$	$f-1.5$	$g-1.0$	$m+1.0$	$n+2.0$	8·9	−·1	0	−·3
Aug. 11	4878	...	$d-2.0$	$f-0.7$	$g+0.3$	$m+1.3$	$n+1.7$	8·4	+·1	0	−·1
Aug. 22	4889	...	$d-1.3$	$f+1.0$	$g+1.0$	$m+1.5$	$n+2.0$	7·7	+·2	0	−·5
Sept. 7	4905	...	$d-1.3$	$f+1.5$	$g+2.0$	$m+2.5$	$n+3.0$	7·0	+·2	0	−·8

T CEPHEI—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1899 Sept. 26	4924	...	$d-1\cdot0$	$f+2\cdot0$	$g+2\cdot5$	$m+3\cdot0$	$n+4\cdot0$	6·4	+·2	0	−·9
Oct. 5	4933	...	$d-1\cdot3$	$f+1\cdot3$	$g+1\cdot3$	$m+2\cdot5$	$n+3\cdot0$	7·1	+·2	0	0
Oct. 13	4941	...	$d-1\cdot3$	$f+1\cdot3$	$g+1\cdot6$	$m+2\cdot0$	$n+3\cdot0$	7·2	+·2	0	+·3
Oct. 24	4952	...	$d-1\cdot0$	$f+1\cdot5$	$g+2\cdot0$	$m+3\cdot0$	$n+3\cdot5$	6·7	+·2	0	0
Nov. 6	4965	...	$d-2\cdot0$	$f+1\cdot0$	$g+1\cdot5$	$m+2\cdot0$	$n+3\cdot0$	7·4	+·2	0	+·9
Nov. 17	4976	...	$d-1\cdot0$	$f+1\cdot0$	$g+1\cdot6$	$m+2\cdot0$	$n+3\cdot0$	7·2	+·2	0	+·9
Dec. 14	5003	...	$d+1\cdot0$	$f+1\cdot7$	$g+2\cdot0$	$m+3\cdot0$	$n+4\cdot0$	6·2	+·3	0	+·3
Dec. 30	5019	...	$d+1\cdot5$	$f+2\cdot0$	$g+2\cdot0$	$m+3\cdot0$	$n+4\cdot0$	6·0	+·3	0	...

From 1900 January 1 a different series of comparison stars was used; and the observations will be more appropriately included with a subsequent series.

S CEPHEI.

R. A. $21^h\ 36^m\ 28^s$. Dec. $+78°\ 10'.5$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1886 Aug. 30	0149	...	2−0·5	4−0·3	5−0·3	...	...	8·8	−·3	0	...
Sept. 18	0168	...	2−0·7	3+0·3	4+0·3	5+0·6	...	8·3	+·2	0	...
Nov. 1	0212	...	3+0·3	4+0·3	...	...	...	8·3	+·3	0	...
Nov. 24	0235	...	=3	=4	...	...	...	8·6	0	0	...
Dec. 18	0259	...	3−1·0	4−1·0	9+0·5	14+0·5	16+0·5	9·3	+·1	+·1	...
1887 Jan. 25	0297	...	3−1·5	4−1·5	10−0·3	12+0·2	...	10·3	−·1	−·2	...
Feb. 25	0328	...	=12	13+0·3	...	...	...	10·8	+·1	−·2	...
Mar. 24	0355	...	12−1·0	=13	...	...	...	11·5	−·1	−·2	...
Apr. 20	0382	...	9−1·7	12−1·0	13+0·2	14−1·0	16−1·0	11·0	−·1	0	...
May 21	0413	...	9−1·5	12−0·5	13−0·2	...	...	11·3	−·2	−·1	...
June 10	0433	...	9−1·5	10−1·5	12−0·5	13+0·2	=18	11·3	−·1	−·2	...
June 16	0439	...	8−0·3	10−1·0	12−1·0	13+0·2	15+1·0	10·9	0	−·1	...
July 5	0458	...	10−0·7	13+0·7	14−1·0	15+1·0	...	10·6	0	+·1	...
July 20	0473	...	12−1·0	13+0·7	14−1·3	15+1·0	16−1·3	10·8	0	+·1	...
Aug. 10	0494	...	10−0·3	12−0·3	14−0·3	16−0·3	...	10·3	−·2	−·1	...
Sept. 8	0523	...	9−2·0	10−0·7	12−0·7	14−1·0	15+0·5	11·1	−·1	0	...
Sept. 20	0535	...	9−1·0 18+0·2	10−1·0	12−0·6	13+0·6	=17	10·9	0	−·2	...
Oct. 14	0559	...	3−1·5	4−1·5	10−0·5	12−0·5	13+0·7	10·6	−·1	−·1	...
Oct. 24	0569	...	9−0·5	10+0·5	12+0·5	14−0·5	=16	9·9	0	−·1	...
Nov. 15	0591	...	=9	10+0·5	12+0·5	=14	16+0·5	9·6	+·2	−·1	...
Dec. 7	0613	...	3−1·8	4−1·8	5−0·7	=10	12+0·5	10·2	−·1	−·1	...
Dec. 22	0628	...	3−0·7	4−0·5	5+1·0	9+1·5	12+2·0	8·6	+·1	−·1	...
1888 Jan. 14	0651	...	3−0·5	=4	9+1·0	10+1·0	12+2·0	8·9	+·1	−·1	...
Feb. 1	0669	...	4−0·3	5−0·6	9+1·0	10+1·0	12+1·5	9·1	+·1	−·1	...
Feb. 24	0692	...	=3 14+0·7	=4	9+0·7	10+1·0	12+1·5	8·9	+·2	−·1	...
Mar. 1	0698	...	3−1·0	4−1·0	9+1·5	10+0·5	14+1·0	9·1	+·1	0	...
Mar. 21	0718	...	3−1·0	4−1·0	10+1·0	12+1·5	14+0·8	9·2	+·1	−·1	...
Apr. 13	0741	...	3−1·5 14+0·3	4−1·5	9+0·5	=10	12+1·0	9·8	+·1	−·1	...
May 1	0759	...	9−0·3 =17	=10	12+0·2	=14	=16	10·0	0	−·1	...
May 11	0769	...	3−2·5 14−1·3	4−2·5 16−1·3	9−0·8	10−0·8	12−1·0	11·0	−·2	0	...
May 31	0789	...	9−0·6	12−0·8	13+0·8	15+0·8	16−1·0	10·7	0	+·1	...
July 11	0830	...	12−1·0	13+1·0	14−2·0	16−2·0	18−0·5	11·3	−·1	0	...
July 26	0845	...	10−3·0	12−3·0	13−0·5	=15	18−1·5	12·5	−·2	−·1	...
Aug. 14	0864	...	12−2·0	13−0·5	14−2·5	15−0·5	16−2·0	11·9	−·2	+·1	...
Aug. 29	0879	...	10−2·0	13−0·5	=15	17−2·0	18−1·0	12·0	−·2	−·1	...
Sept. 6	0887	...	12−2·0	13−1·0	14−2·5	15−1·0	18−1·5	12·3	−·2	0	...
Sept. 14	0895	...	10−2·5	12−2·5	13−0·5	=15	18−1·0	12·2	−·2	−·1	...
Oct. 1	0912	...	13−0·3	15−0·3	18−1·0	...	...	11·7	−·2	+·1	...
Oct. 14	0925	...	12−0·5	13+0·5	15+1·0	17−0·5	=18	10·8	0	−·1	...

S Cephei—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1888 Oct. 30	0941	...	9−2·0 17−2·0	10−2·5 18+0·5	12−2·0	13+0·5	16−2·0	11·8	−·1	−·1	...
Nov. 27	0969	...	10−2·0	12−1·5	13+0·5	15+1·0	=18	11·3	0	−·1	...
Dec. 14	0986	...	10−1·0	12−1·0	13+1·0	14−2·0	=18	11·1	−·1	−·1	...
1889 Jan. 1	1004	...	10−2·0	=12	13+1·0	15+1·5	18+0·5	10·7	+·1	−·1	...
Feb. 14	1048	...	10−2·0	12−1·0	13+1·0	14−2·0	=18	11·3	−·1	−·1	...
Mar. 11	1073	...	=9	10−0·5	12+0·5	13+1·5	14−0·5	10·1	0	−·1	...
Mar. 27	1089	...	3−1·0 17+0·5	4−1·0	10+0·3	12+1·0	14+0·5	9·6	+·1	−·2	...
Apr. 10	1103	...	3−1·0	4−0·5	10+1·0	12+2·5	...	9·0	0	−·2	−1·4
Apr. 25	1118	...	3−1·0	=4	=5	10+0·5	12+2·5	9·0	+·1	−·1	−1·2
May 15	1138	...	3−1·3	4−0·5	10+0·5	12+2·0	14+0·5	9·3	+·1	−·1	−·9
May 23	1146	...	3−1·6 =16	4−1·0	10+0·5	12+1·5	=14	9·7	0	0	−·6
June 12	1166	...	3−1·3	4−1·0	10+0·7	12+1·0	14+0·7	9·5	+·1	−·1	−·9
June 30	1184	...	3−2·0	4−1·6	10−1·0	12+0·7	14+0·4	10·2	0	−·1	−·5
July 21	1205	...	=10	12+0·5	14−0·7	17+1·0	18+2·0	9·8	+·1	−·2	−1·2
Aug. 9	1224	...	=9	10−1·2	12+0·3	14−0·3	17−0·2	10·4	−·1	−·2	−1·1
Aug. 30	1245	...	9−0·7 18+0·5	10−0·7	12−0·5	13+1·0	17−0·5	10·7	−·1	−·2	−1·2
Sept. 17	1263	...	3−2·0	4−1·5	10−0·8	12−0·8	13+0·5	10·8	−·1	−·1	−1·3
Sept. 30	1276	...	10−1·7	12−2·0	13+0·3	18−0·5	...	11·8	−·1	−·2	−·7
Oct. 12	1288	...	10−1·5	12−0·7	13+0·5	17−0·5	=18	11·1	−·1	−·2	−1·5
Oct. 23	1299	132	13−0·5	=15	18−1·0	19−0·5	=20	11·7	−·1	+·2	−·6
Nov. 25	1332	...	13−1·0	15−0·5	18−1·0	=19	...	11·8	−·1	+·2	−·6
Dec. 7	1344	...	12−2·5	13+0·5	15+1·0	17−1·5	18−0·5	11·5	0	−·1	−1·1
Dec. 13	1350	...	=15	17−2·0	18−0·8	=19	...	11·7	−·1	+·1	−·8
Dec. 24	1361	...	12−2·5	13−0·3	15+0·2	17−2·5	18−1·0	12·1	−·1	−·1	−·5
1890 Jan. 10	1378	132	13−0·5	15−0·2	19−0·5	...	...	11·7	−·2	+·3	−·6
Feb. 7	1406	...	12−0·8	13+0·3	14−1·3	17−0·6	18−0·2	11·1	−·1	−·1	−1·4
Feb. 18	1417	...	12−1·0	13+0·5	14−1·5	18−0·5	19+0·7	11·1	0	+·1	−1·0
Mar. 9	1436	...	12−1·3	13+1·0	17−1·5	=18	19+2·0	10·9	0	−·1	−1·3
Mar. 20	1447	...	12−0·5	13+0·7	17−0·7	18+1·0	19+0·7	10·7	0	−·1	−1·4
Apr. 11	1469	...	12−0·7	13+1·0	14 1·5	17−0·5	18+0·5	10·8	0	−·1	−1·1
May 22	1510	...	10−0·5	=12	13+2·0	14−0·7	15+2·0	10·0	0	0	−1·3
June 15	1534	...	10−0·2	=12	14−0·7	17+0·5	18+1·5	10·2	0	−·2	−1·1
July 5	1554	...	4−1·5	10+0·2	12+0·5	14−0·2	17+0·5	10·0	0	−·2	−1·0
July 22	1571	...	3−1·5 14+0·7	4−1·5	9+1·0	10+0·7	12+1·3	9·5	+·1	−·1	−1·0
Aug. 6	1586	...	3−1·3	4−0·6	10+1·0	12+1·5	14+1·0	9·2	+·1	−·1	−1·0
Aug. 23	1603	...	3−1·0	9+0·7	10+1·0	12+1·0	14+0·8	9·2	+·2	−·1	−·6
Sept. 1	1612	...	3−1·0	4−1·0	10+1·0	12+1·3	14+1·0	9·2	+·1	−·1	−·6
Sept. 10	1621	...	3−1·0	4−0·7	10+1·0	12+1·5	14+0·5	9·2	+·1	−·1	−·5
Oct. 9	1650	...	3−0·2	4−0·7	10+1·0	14+1·0	17+1·3	9·0	+·1	−·1	−·6
Oct. 26	1667	...	3−1·0	4−1·5	10+0·5	12+1·0	14+0·3	9·6	+·1	−·1	−·1
Nov. 9	1681	...	=10	12+0·8	=14	17+1·0	18+2·0	9·6	+·2	−·2	−·2
Nov. 25	1697	...	4−2·0	10+0·3	12+0·6	14−0·3	17+1·0	10·0	0	−·2	−·4
Dec. 24	1726	...	10−0·8	12−0·6	17−0·5	18+0·5	...	11·0	−·1	−·3	−·3

S Cephei—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1891 Jan. 7	1740	...	12−0·6	13+0·6	17−0·5	18+0·3	20+1·2	10·8	0	−·2	− ·6
Feb. 5	1769	80	12−2·0	13− 1·0	...	...	...	12·5	−·2	−·2	0
Feb. 15	1779	...	=13	15+0·5	18−1·3	19+0·5	=20	11·4	0	+·2	− ·9
Feb. 25	1789	...	13−0·3	=15	18−1·2	=19	20−0·3	11·7	−·1	+·2	− ·9
Mar. 14	1806	80	13−0·5	15−0·3	=21	...	...	12·0	−·1	+·2	− ·9
Mar. 30	1822	80	13−1·5	15−0·5	18−1·5	19−1·0	21−0·5	12·5	−·2	+·2	− ·6
Apr. 19	1842	132	13−1·0	15−0·5	19−0·7	...	...	12·0	−·2	+·3	−1·0
May 16	1869	132	13−1·5	15−1·0	18−2·0	21−0·5	...	12·8	−·2	+·1	− ·3
June 2	1886	80	13−1·0	15−0·7	19−0·5	=20	21−0·5	12·1	−·2	+·2	− ·9
July 4	1918	...	10−1·3	12−1·3	14−2·0	17−1·5	18−0·3	11·7	−·2	−·2	−1·5
July 12	1926	80	10−2·0	12−1·0	17−1·3	18−0·5	...	11·8	−·2	−·3	−1·5
Aug. 4	1949	...	12−1·5	13−0·3	15+0·5	17−1·0	=19	11·5	−·1	0	−1·3
Aug. 23	1968	...	13−0·3	=15	17−2·0	18−1·0	21+1·0	11·8	−·1	0	− ·9
Sept. 4	1980	...	12−2·0	13−0·2	15−0·5	18−1·2	21+0·6	12·0	−·1	0	− ·6
Oct. 2	2008	...	12−2·0	13−0·8	15−0·3	19−0·3	21+0·5	12·0	−·1	+·1	− ·3
Oct. 23	2029	...	12−1·3	=13	14−1·6	15+1·0	18+0·6	11·0	0	0	− ·9
Oct. 30	2036	...	12−0·5	13+0·6	14−1·2	18+0·6	19+1·5	10·5	0	+·1	−1·2
Nov. 16	2053	...	3−1·3	=10	12+0·5	14−0·5	18+0·2	10·2	0	−·1	−1·2
Nov. 27	2064	...	=10	12+0·6	13+2·0	14−0·7	=17	10·0	0	−·2	− ·3
Dec. 20	2087	...	3−1·3	10+0·2	12+1·0	=14	17+1·0	9·7	+·1	−·2	− ·3
1892 Feb. 1	2130	...	3−1·5	=10	12+0·2	14−0·5	=17	10·3	0	−·2	− ·4
Feb. 23	2152	...	10−1·0	12+0·5	14−1·0	=17	18−1·0	10·9	−·1	−·2	− ·3
Mar. 8	2166	...	10−0·3	12+0·3	...	...	...	12·3	0	−·4	+ ·8
Mar. 19	2177	...	12−1·0	13+0·6	15+1·0	17−1·0	=18	11·0	0	−·1	− ·4
Apr. 2	2191	...	12−1·0	13+1·0	15+1·2	17−1·5	18−0·5	11·1	0	−·1	− ·5
Apr. 29	2218	80	12−2·0	13+0·2	17−1·5	18−0·7	19+1·0	11·5	0	−·1	− ·5
May 24	2243	...	12−2·5	13−0·3	18−1·2	19−0·3	=21	12·2	−·2	0	− ·2
June 5	2255	...	12−1·7	=13	17−2·0	18−1·0	19+0·3	11·8	−·1	−·1	− ·7
June 23	2273	132	13−1·7	15−1·5	21−1·0	...	...	13·1	−·2	+·2	+ ·6
June 30	2280	132	13−2·0	15−1·5	...	...	...	13·1	−·2	+·2	+ ·5
July 20	2300	80	15−1·5	21−1·0	...	...	...	13·2	−·2	+·2	+ ·4
July 29	2309	132	13−2·0	15−1·5	...	...	...	13·0	−·2	+·2	+ ·2
Aug. 15	2326	80	13−3·0	15−2·0	21−1·0	...	...	13·7	−·2	+·2	+ ·8
Sept. 10	2352	80	13−1·5	15−1·0	18−2·0	19−1·0	21−0·6	12·7	−·2	+·2	− ·2
Sept. 28	2370	...	13−0·5	15−0·5	18−1·0	=19	21+0·5	11·8	−·1	+·2	− ·9
Oct. 7	2379	80	13−1·0	15−1·0	19−1·0	...	...	12·3	−·2	+·3	− ·4
Oct. 18	2390	132	13−1·0	15−1·0	18−2·0	19−1·0	21−0·5	12·6	−·2	+·2	− ·1
Nov. 9	2412	80	13−1·0	15−0·5	19−0·5	=21	...	12·1	−·2	+·2	− ·3
Nov. 26	2429	...	12−1·5	13+0·3	15+1·0	18−0·3	19+1·0	11·0	0	+·1	−1·1
Dec. 12	2445	...	12−1·5	13+0·5	15+1·0	17−2·0	18−0·5	11·4	0	−·1	− ·7
Dec. 29	2462	...	10−1·0	12−1·0	13+1·0	14−1·5	19+2·0	10·7	0	0	−1·0

S Cephei—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections. Scale.	Corrections. Stars.	Apparent Correction to Harvard.
1893 Jan. 11	2475	...	$g-1\cdot5$	$h-1\cdot3$	$=k$	$l-0\cdot5$	$m+1\cdot0$	11·1	0	−·1	− ·3
Jan. 18	2482	...	$g-2\cdot0$	$h-1\cdot0$	$k-0\cdot3$	$l-0\cdot3$	$m+1\cdot0$	11·1	−·1	−·1	− ·3
Feb. 4	2499	...	$g-1\cdot5$	$h-0\cdot5$	$k-1\cdot0$	$l-1\cdot0$	$m+1\cdot0$	11·2	−·1	−·1	+ ·3
Feb. 11	2506	...	$c-1\cdot5$	$g+0\cdot5$	$h+1\cdot5$	$k+1\cdot5$	$l+1\cdot0$	9·4	+·1	−·1	−1·1
Feb. 14	2509	...	$c-1\cdot3$	$g-0\cdot3$	$h+0\cdot5$	$k+1\cdot0$	$m+2\cdot0$	9·7	0	0	− ·7
Feb. 26	2521	...	$c-1\cdot3$	$g+1\cdot0$	$h+1\cdot5$	$k+1\cdot0$	$l+1\cdot5$	9·3	+·1	−·1	− ·8
Mar. 8	2531	...	$c-1\cdot0$	$g+1\cdot0$	$h+1\cdot5$	$l+1\cdot5$	$m+2\cdot0$	9·2	+·1	0	− ·4
Mar. 16	2539	...	$c-1\cdot0$	$e+0\cdot5$	$g+1\cdot2$	$h+1\cdot2$	$m+3\cdot0$	8·8	+·1	+·1	− ·4
Mar. 23	2546	...	$c-1\cdot0$	$e+0\cdot5$	$g+1\cdot0$	$h+1\cdot3$	$l+1\cdot5$	8·9	+·1	0	− ·2
Apr. 6	2560	...	$\left\{\begin{matrix}c-1\cdot0\\l+2\cdot0\end{matrix}\right.$	$e-0\cdot3$	$g+1\cdot0$	$h+1\cdot5$	$k+1\cdot5\}$	9·0	+·1	0	+ ·1
Apr. 18	2572	...	$c-1\cdot0$	$e+0\cdot7$	$g+1\cdot5$	$h+2\cdot0$	$l+2\cdot0$	8·6	+·1	0	− ·2
May 5	2589	...	$c-1\cdot0$	$e+0\cdot7$	$g+1\cdot0$	$h+1\cdot5$	$k+1\cdot5$	8·9	+·1	0	+ ·1
May 13	2597	...	$c-1\cdot0$	$e+0\cdot2$	$g+1\cdot0$	$h+1\cdot5$	$l+2\cdot0$	8·9	+·1	0	0
May 26	2610	...	$c-1\cdot0$	$e+1\cdot0$	$g+1\cdot0$	$h+2\cdot0$	...	8·5	+·1	+·1	− ·4
June 7	2622	...	$c-1\cdot0$	$e+0\cdot3$	$g+1\cdot0$	$h+1\cdot3$	$k+1\cdot3$	9·0	+·1	0	− ·1
June 14	2629	...	$c-0\cdot8$	$e-0\cdot5$	$g+1\cdot0$	$h+1\cdot0$	$k+1\cdot5$	9·2	0	0	0
June 29	2644	...	$c-1\cdot0$	$e+0\cdot5$	$g+0\cdot8$	$h+1\cdot2$	...	8·8	+·1	+·1	− ·4
July 24	2669	...	$c-1\cdot0$	$e-0\cdot5$	$g+1\cdot2$	$h+1\cdot2$	$k+1\cdot0$	9·2	0	0	− ·5
Aug. 13	2689	...	$\left\{\begin{matrix}c-1\cdot6\\l+1\cdot0\end{matrix}\right.$	$e-1\cdot3$	$g-0\cdot3$	$h+0\cdot3$	$k+1\cdot0\}$	9·9	0	0	− ·2
Aug. 28	2704	...	$e-1\cdot3$	$g-0\cdot5$	$h+0\cdot5$	$k+1\cdot3$	$l+1\cdot3$	9·8	0	0	− ·4
Sept. 9	2716	...	$e-3\cdot0$	$g-2\cdot0$	$h-1\cdot5$	$=k$	$l-1\cdot0$	11·6	−·1	0	+1·1
Sept. 30	2737	...	$c-2\cdot3$	$e-1\cdot7$	$g-1\cdot5$	$h-0\cdot5$	...	10·8	−·1	+·1	+ ·1
Oct. 12	2749	...	$e-2\cdot5$	$g-1\cdot0$	$=h$	$k+0\cdot5$	$l+0\cdot5$	10·6	0	0	− ·4
Oct. 30	2767	...	$c-2\cdot5$	$e-1\cdot7$	$g-1\cdot5$	$h-1\cdot0$	$l-0\cdot2$	11·0	−·1	0	− ·4
Nov. 7	2775	...	$c-2\cdot5$	$e-2\cdot0$	$g-1\cdot5$	$h-1\cdot0$	...	11·0	−·1	+·1	− ·5
Dec. 9	2807	...	$e-2\cdot6$	$g-2\cdot0$	$h-1\cdot0$	$k-1\cdot5$	$l-1\cdot0$	11·7	−·1	0	− ·4
Dec. 30	2828	...	$c-3\cdot5$	$e-3\cdot0$	$g-2\cdot0$	$h-1\cdot0$	...	11·7	−·1	+·1	− ·3
1894 Jan. 20	2849	...	$e-2\cdot0$	$g-2\cdot0$	$h-1\cdot0$	$k-0\cdot6$	$=l$	11·2	−·1	0	− ·8
Jan. 30	2859	...	$e-2\cdot5$	$g-2\cdot0$	$h-1\cdot5$	$k-1\cdot5$	$l-1\cdot0$	11·8	−·1	0	− ·1
Feb. 13	2873	...	$e-2\cdot0$	$g-1\cdot0$	$h-0\cdot5$	$k+0\cdot5$	$l+0\cdot5$	10·6	0	0	−1·0
Feb. 27	2887	...	$e-1\cdot5$	$g-1\cdot0$	$=h$	$k+0\cdot5$	$l+0\cdot5$	10·4	0	0	−1·0
Mar. 8	2896	...	$\left\{\begin{matrix}c-1\cdot7\\l+1\cdot0\end{matrix}\right.$	$e-1\cdot3$	$g-0\cdot5$	$h+0\cdot5$	$k+0\cdot5\}$	10·1	0	0	−1·2
Mar. 19	2907	...	$c-1\cdot5$	$e-0\cdot6$	$g+0\cdot7$	$h+1\cdot3$	$k+1\cdot0$	9·4	0	0	−1·8
Mar. 27	2915	...	$c-2\cdot0$	$e-1\cdot0$	$g-0\cdot3$	$h+1\cdot0$	$l+1\cdot0$	9·9	0	0	−1·2
Apr. 12	2931	...	$c-1\cdot3$	$e-1\cdot0$	$g-0\cdot5$	$h+1\cdot0$	$l+1\cdot0$	9·8	0	0	−1·0
Apr. 28	2947	...	$c-1\cdot5$	$e-1\cdot0$	$g+1\cdot0$	$h+1\cdot0$	$l+1\cdot5$	9·4	0	0	−1·2
May 18	2967	...	$c-1\cdot5$	$e-0\cdot3$	$g+1\cdot0$	$h+1\cdot3$	$l+1\cdot3$	9·2	0	0	−1·1
May 29	2978	...	$c-1\cdot3$	$e-0\cdot3$	$g+0\cdot5$	$h+1\cdot2$	$k+1\cdot0$	9·4	0	0	− ·7
June 13	2993	...	$c-1\cdot5$	$e-0\cdot3$	$g+1\cdot3$	$h+1\cdot3$	...	9·1	0	+·1	− ·6
June 27	3007	...	$c-1\cdot0$	$e+1\cdot0$	$g+1\cdot0$	$h+1\cdot7$	...	8·6	+·1	+·1	− ·7
July 7	3017	...	$c-1\cdot0$	$e+0\cdot6$	$g+1\cdot2$	$h+1\cdot6$	...	8·7	+·1	+·1	− ·3
July 27	3037	...	$c-1\cdot3$	$e+0\cdot7$	$g+1\cdot0$	$h+1\cdot3$	$l+1\cdot3$	9·0	+·1	0	+ ·2
Aug. 27	3068	...	$c-1\cdot0$	$e+1\cdot3$	$g+1\cdot5$	$h+2\cdot0$	...	8·3	+·1	+·1	− ·3
Sept. 6	3078	...	$c-1\cdot0$	$e+1\cdot0$	$g+1\cdot0$	$h+1\cdot4$	$l+2\cdot0$	8·7	+·1	0	0

S Cephei—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1894 Sept. 19	3091	...	$e+1.0$	$g+1.0$	$h+1.5$	...	...	8.5	+.2	+.2	+ .1
Oct. 21	3123	...	$c-0.7$	$e+1.0$	$g+1.5$	$h+2.0$	...	8.3	+.1	+.1	− .4
Nov. 16	3149	...	$c-1.2$	$e+1.0$	$g+1.0$	$h+1.5$	...	8.7	+.1	+.1	− .2
Nov. 30	3163	...	$c-1.0$	$e+1.0$	$g+1.0$	$h+1.5$	...	8.7	+.1	+.1	− .5
Dec. 20	3183	...	$c-1.5$	$e-1.0$	$g+1.0$	$h+1.5$	$l+1.5$	9.3	0	0	− .6
1895 Jan. 23	3217	...	$c-1.3$	$e-0.3$	$g+0.5$	$h+1.0$	...	9.3	0	+.1	−1.2
Feb. 11	3236	...	$e-1.5$	$g-1.3$	$h-0.7$	$k+0.5$	$l+0.7$	10.6	0	0	− .5
Feb. 19	3244	...	$e-1.5$	$g-1.0$	$h-0.3$	$k+0.5$	$l+1.0$	10.4	0	0	− .8
Mar. 7	3260	...	$e-1.4$	$g-1.0$	$=h$	$k+0.5$	$l+1.0$	10.3	0	0	−1.2
Mar. 21	3274	...	$e-3.0$	$g-2.0$	$h-2.0$	$k-1.5$	$l-1.0$	12.0	−.1	0	+ .3
Apr. 11	3295	...	$e-3.0$	$g-2.0$	$h-1.0$	$k-0.5$	$=l$	11.4	−.1	0	− .5
May 9	3323	...	$e-2.0$	$g-1.5$	$h-1.5$	$k-0.8$	$l-0.3$	11.3	−.1	0	− .7
May 22	3336	...	$e-1.0$	$g-0.7$	$h+0.3$	$=k$	$l+0.5$	10.3	0	0	−1.5
June 2	3347	...	$e-1.3$	$g-0.8$	$h-0.3$	$k-0.3$	$l-0.3$	10.7	−.1	0	−1.1
June 27	3372	...	$e-1.0$	$g-0.5$	$h+0.3$	$k+1.0$	$l+1.0$	9.9	0	0	−1.6
Aug. 3	3409	...	$c-1.5$	$e-1.0$	$g+0.8$	$h+1.0$	$l+1.0$	9.5	0	0	−1.4
Aug. 17	3423	...	$c-1.5$	$e-1.0$	$=g$	$h-0.5$	$l+0.8$	10.0	−.1	0	− .7
Aug. 31	3437	...	$e-0.5$	$g-0.3$	$h+0.3$	$=k$	$=l$	10.2	0	0	− .2
Sept. 18	3455	...	$c-1.3$	$e-0.5$	$g-0.3$	$h+0.5$	$l+1.0$	9.7	0	0	− .4
Sept. 26	3463	...	$e-1.0$	$g-0.5$	$h+0.3$	$k+0.7$	$l+0.7$	10.1	0	0	+ .1
Oct. 10	3477	...	$c-1.5$	$e-0.5$	$=g$	$h+1.0$	$k+1.0$	9.6	0	0	− .2
Oct. 23	3490	...	$c-1.5$	$=e$	$g+0.6$	$h+1.0$	...	9.3	0	+.1	− .2
Nov. 1	3499	...	$c-1.0$	$e+0.3$	$g+0.8$	$h+1.3$	...	8.9	+.1	+.1	− .3
Nov. 23	3521	...	$e+0.5$	$g+1.3$	$h+1.5$	$k+1.5$	$l+2.0$	8.7	+.2	0	− .2
Dec. 10	3538	...	$c-1.0$	$e+1.0$	$g+1.3$	$h+1.7$	$l+2.0$	8.6	+.1	0	− .2
1896 Jan. 15	3574	...	$c-0.8$	$e+1.0$	$g+1.0$	$h+1.5$	$l+1.5$	8.8	+.1	0	+ .2
Feb. 1	3591	...	$c-1.2$	$e+1.0$	$g+1.3$	$h+1.6$	$l+2.0$	8.7	+.1	0	+ .2
Feb. 22	3612	...	$e+1.0$	$g+1.5$	$h+2.0$	$k+1.5$	$l+2.0$	8.5	+.2	0	0
Mar. 16	3635	...	$e-1.5$	$e-0.5$	$g+1.0$	$h+1.5$	...	9.2	0	+.1	+ .3
Mar. 29	3648	...	$c-1.0$	$e+1.0$	$g+1.2$	$h+1.7$	$k+1.7$	8.7	+.1	0	− .4
Apr. 15	3665	...	$c-1.2$	$=e$	$g+1.0$	$h+1.5$	...	9.0	+.1	+.1	− .3
Apr. 26	3676	...	$c-1.3$	$e+0.3$	$g+1.0$	$h+1.5$	$k+1.5$	9.0	+.1	0	− .7
May 9	3689	...	$c-1.3$	$e+1.0$	$g+1.0$	$h+1.3$	$l+1.3$	8.9	+.1	0	−1.0
May 26	3706	...	$c-1.3$	$e+0.5$	$g+0.5$	$h+1.3$	...	9.0	+.1	+.1	−1.1
June 19	3730	...	$e-0.5$	$=g$	$h+0.7$	$k+1.0$	$l+1.0$	9.7	+.1	0	−1.1
July 12	3753	...	$c-1.5$	$e-0.5$	$g+1.0$	$h+1.5$	$l+1.5$	9.2	0	0	−2.1
July 30	3771	...	$e-0.8$	$g+0.8$	$h+1.3$	$k+1.0$	$l+1.0$	9.4	+.1	0	−2.0
Aug. 13	3785	...	$c-1.5$	$e-1.0$	$=g$	$h+0.6$	$l+0.8$	9.8	0	0	−1.7
Sept. 2	3805	...	$c-1.3$	$e-0.3$	$g+0.7$	$h+1.3$	$k+1.0$	9.3	0	0	−2.1
Sept. 27	3830	...	$c-2.3$	$e-1.0$	$g-0.3$	$h+0.7$	$l+1.0$	10.0	0	0	− .9
Oct. 12	3845	...	$c-1.3$	$e-0.6$	$g+1.0$	$h+1.3$	$l+1.0$	9.2	0	0	−1.3
Oct. 28	3861	...	$c-2.0$	$e-0.3$	$g+0.7$	$h+1.3$	$k+1.3$	9.4	0	0	− .7
Nov. 6	3870	...	$c-1.3$	$e+0.6$	$g+1.3$	$h+1.7$	$l+1.5$	8.8	+.1	0	− .9
Nov. 20	3884	...	$c-1.0$	$e+0.5$	$g+1.3$	$h+2.0$	$l+2.0$	8.6	+.1	0	− .8
Dec. 7	3901	...	$c-1.0$	$e+1.0$	$g+1.5$	$h+2.0$	...	8.4	+.1	+.1	− .5
1897 Jan. 1	3926	...	$c-1.0$	$e+1.0$	$g+1.5$	$h+1.8$	$l+2.0$	8.5	+.1	0	0

δ Cephei—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1897 Jan. 26	3951	...	$=c$	$e+1.3$	$g+1.6$	$h+2.0$	...	8.1	+.2	+.1	+.2
Feb. 14	3970	...	$=c$	$e+1.4$	$g+1.7$	$h+2.3$	...	7.9	+.2	+.1	+.1
Mar. 6	3990	...	$c+0.6$	$e+1.4$	$g+1.6$	$h+2.0$	$l+2.0$	8.1	+.2	0	+.3
Mar. 22	4006	...	$c+1.2$	$e+2.0$	$g+2.5$	$h+3.0$	...	7.1	+.2	+.1	−.6
Mar. 28	4012	...	$c+0.3$	$e+1.7$	$g+2.0$	$h+2.5$	...	7.7	+.2	+.1	0
Apr. 10	4025	...	$c+0.7$	$e+1.3$	$g+1.3$	$h+1.8$	$k+1.5$	8.3	+.2	0	+.5
Apr. 23	4038	...	$c+0.8$	$e+1.3$	$g+1.6$	$h+2.0$	$k+2.0$	8.1	+.2	0	+.3
May 11	4056	...	$c+1.0$	$e+1.3$	$g+2.0$	$h+2.3$	$k+2.0$	7.9	+.2	0	0
May 22	4067	...	$c+1.0$	$e+1.3$	$g+2.0$	$h+2.7$	$k+2.7$	7.7	+.2	0	−.3
June 4	4080	...	$c-1.0$	$e+1.3$	$g+1.5$	$h+2.0$	...	8.3	+.1	+.1	+.3
June 16	4092	...	$c+0.8$	$e+1.3$	$g+1.5$	$h+2.0$	...	7.9	+.2	+.1	−.1
July 15	4121	...	$c+1.3$	$e+1.6$	$g+2.0$	$h+2.3$	$k+2.3$	7.7	+.2	0	−.7
Aug. 3	4140	...	$=c$	$e+1.0$	$g+1.5$	$h+2.0$	$k+2.0$	8.3	+.2	0	−.3
Sept. 10	4178	...	$c-0.7$	$e+1.5$	$g+1.7$	$h+2.3$	$k+2.3$	8.2	+.1	0	−1.0
Sept. 26	4194	...	$c-1.3$	$e+1.0$	$g+1.4$	$h+2.0$	...	8.5	+.1	+.1	−.9
Oct. 27	4225	...	$c-1.5$	$e-0.6$	$g+0.3$	$h+0.7$	$l+1.5$	9.5	0	0	−.9
Nov. 19	4248	...	$c-2.0$	$e-0.7$	$g+0.5$	$h+1.0$	$k+1.0$	9.6	0	0	−1.7
Dec. 3	4262	...	$c-1.5$	$e-0.3$	$g+0.3$	$h+1.0$	...	9.4	0	+.1	−2.1
Dec. 24	4283	...	$e-1.5$	$g-1.0$	$=h$	$k-1.0$	$=l$	10.8	−.1	0	−1.2
1898 Feb. 6	4327	...	$e-1.2$	$g-0.8$	$h+0.3$	$k+0.5$	$l+1.0$	10.1	0	0	−2.1
Feb. 20	4341	...	$c-2.3$	$e-1.5$	$g-0.7$	$h-0.3$	$k-0.3$	10.6	−.2	0	−1.8
Mar. 7	4356	...	$c-2.0$	$e-0.7$	$g+0.5$	$h+1.5$	$k+1.0$	9.5	+.1	0	−2.2
Mar. 14	4363	...	$c-2.5$	$e-1.0$	$g+1.0$	$h+1.7$	$k+1.7$	9.4	+.1	0	−2.1
Apr. 4	4384	...	$c-1.8$	$e+0.7$	$g+1.0$	$h+1.7$	$k+1.3$	9.0	+.2	0	−1.6
Apr. 22	4402	...	$c-2.3$	$e-1.3$	$g+0.7$	$h+1.3$	$l+1.5$	9.6	+.1	0	−.6
May 23	4433	...	$c-1.3$	$e+1.0$	$g+0.7$	$h+1.5$	$l+1.5$	8.9	+.2	0	−.8
June 10	4451	...	$c-1.7$	$e-0.3$	$g+1.0$	$h+1.3$	$l+2.0$	9.1	+.1	0	−.5
June 22	4463	...	$c-1.7$	$e-0.5$	$g+1.0$	$h+1.3$	$k+1.0$	9.4	+.1	0	−.1
July 7	4478	...	$c-1.2$	$e+1.0$	$g+1.3$	$h+1.7$	$l+2.0$	8.6	+.2	0	−1.2
July 30	4501	...	$c-1.3$	$e+1.0$	$g+1.7$	$h+2.0$	$l+2.0$	8.5	+.2	0	−1.7
Aug. 16	4518	...	$c-1.0$	$e+1.0$	$g+1.5$	$h+2.0$	$l+2.0$	8.5	+.2	0	−1.6
Sept. 10	4543	...	$c-0.7$	$e+1.5$	$g+2.0$	$h+2.5$	$l+2.5$	8.0	+.2	0	−1.7
Sept. 24	4557	...	$c-0.8$	$e+1.0$	$g+1.5$	$h+2.0$	$l+2.0$	8.5	+.2	0	−.9
Oct. 3	4566	...	$c-1.0$	$e+1.0$	$g+1.7$	$h+2.5$	$k+2.0$	8.4	+.2	0	−.7
Oct. 31	4594	...	$c-0.8$	$e+1.0$	$g+1.5$	$h+2.0$	$l+2.0$	8.5	+.2	0	0
Nov. 21	4615	...	$c-2.0$	$e+0.6$	$g+1.0$	$h+1.7$	$l+2.0$	8.9	+.2	0	+.3
Dec. 13	4637	...	$c-1.5$	$=e$	$g+0.5$	$h+1.3$	$l+2.0$	9.1	+.1	0	+.2
Dec. 20	4644	...	$c-1.5$	$=e$	$g+1.0$	$h+1.4$	$l+1.8$	9.1	+.1	0	+.1
1899 Jan. 5	4660	...	$c-2.0$	$e+0.7$	$g+1.5$	$h+2.0$	$l+2.0$	8.8	+.2	0	−.4
Jan. 28	4683	...	$e-1.5$	$g-1.0$	$h+0.5$	$k+0.7$	$l+1.0$	10.2	0	0	+.2
Feb. 16	4702	...	$c-3.0$	$e-2.0$	$g-1.0$	$h+0.5$	$k-1.0$	10.9	−.1	0	+.1
Feb. 24	4710	...	$e-2.0$	$g-1.0$	$=h$	$k-1.0$	$=l$	10.9	−.1	0	−.2
Mar. 10	4724	80	$e-2.0$	$g-1.3$	$h-0.5$	$k-1.0$	$l-0.5$	11.2	−.2	0	−.6
Mar. 17	4731	...	$c-3.0$	$e-2.0$	$g-1.3$	$h-0.7$	$l-0.3$	11.1	−.2	0	−.9
Mar. 24	4738	...	$c-3.0$	$e-2.0$	$g-1.3$	$h-0.7$	$l-0.5$	11.1	−.2	0	−1.2
Apr. 19	4764	...	$e-2.5$	$g-2.0$	$h-1.5$	$k-1.3$	$l-1.0$	11.8	−.2	0	−.7

S CEPHEI—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections. Scale.	Corrections. Stars.	Apparent Correction to Harvard.
1899 May 2	4777	...	$e-3\cdot0$	$g-2\cdot5$	$h-2\cdot0$	$k-2\cdot0$	$l-2\cdot0$	12·4	−·2	0	− ·1
May 28	4803	...	$e-2\cdot5$	$g-2\cdot0$	$h-2\cdot0$	$k-1\cdot3$	$l-1\cdot0$	11·9	−·2	0	− ·4
June 14	4820	...	$c-2\cdot5$	$e-1\cdot5$	$g-1\cdot0$	$h-0\cdot3$	$=l$	10·7	−·2	0	−1·0
June 29	4835	...	$e-2\cdot0$	$g-1\cdot2$	$h-0\cdot2$	$=k$	$=l$	10·8	−·1	0	− ·3
July 8	4844	...	$e-1\cdot3$	$g-0\cdot8$	$h-0\cdot2$	$k+0\cdot5$	$l+0\cdot5$	10·4	0	0	− ·4
July 28	4864	...	$c-2\cdot5$	$e-1\cdot3$	$g-0\cdot7$	$h+0\cdot3$	$k+1\cdot0$	10·2	0	0	− ·2
Aug. 11	4878	...	$e-1\cdot5$	$g-0\cdot5$	$h+0\cdot3$	$k+0\cdot7$	$l+0\cdot7$	10·2	0	0	0
Aug. 22	4889	...	$e-1\cdot3$	$g-0\cdot5$	$h+0\cdot3$	$k+0\cdot5$	$l+0\cdot8$	10·1	0	0	0
Sept. 16	4914	...	$e-1\cdot5$	$g-0\cdot7$	$h+0\cdot3$	$k+1\cdot0$	$l+1\cdot0$	10·1	0	0	+ ·1
Sept. 27	4925	...	$e-1\cdot3$	$g-0\cdot5$	$h+0\cdot5$	$k+1\cdot0$	$l+0\cdot5$	10·1	0	0	+ ·1
Oct. 5	4933	...	$e-1\cdot3$	$g-0\cdot6$	$h+0\cdot3$	$=k$	$l+0\cdot5$	10·3	0	0	+ ·2
Oct. 24	4952	...	$e-1\cdot5$	$g-0\cdot5$	$h+1\cdot0$	$k+1\cdot5$	$l+1\cdot3$	9·7	+·1	0	− ·4
Nov. 13	4972	...	$e-1\cdot0$	$g-0\cdot7$	$h+0\cdot3$	$k+1\cdot2$	$l+1\cdot2$	9·9	+·1	0	− ·2
Dec. 14	5003	...	$c-1\cdot5$	$e+1\cdot5$	$g+1\cdot7$	$h+2\cdot3$	$l+2\cdot5$	8·3	+·2	0	...
Dec. 30	5019	...	$c-1\cdot0$	$e+1\cdot0$	$g+1\cdot5$	$h+2\cdot0$	$k+2\cdot0$	8·5	+·2	0	...
1900 Jan. 9	5029	...	$c-1\cdot5$	$e+1\cdot0$	$g+1\cdot5$	$h+2\cdot0$	$l+2\cdot0$	8·6	+·2	0	...
Jan. 27	5047	...	$e+1\cdot0$	$g+1\cdot5$	$h+2\cdot5$	$k+1\cdot5$	$l+2\cdot0$	8·4	+·3	0	...
Feb. 6	5057	...	$e+1\cdot0$	$g+1\cdot5$	$h+2\cdot0$	$k+1\cdot5$	$l+2\cdot0$	8·5	+·3	0	...
Feb. 20	5071	...	$e+1\cdot0$	$g+1\cdot6$	$h+2\cdot2$	$k+2\cdot0$	$l+2\cdot2$	8·3	+·3	0	...
											G.M.T. h m
Mar. 13	5092	...	$c-1\cdot3$	$e+1\cdot0$	$g+1\cdot5$	$h+2\cdot0$	...	8·5	+·2	+·1	7 30
Mar. 29	5108	...	$c-1\cdot7$	$e+0\cdot7$	$g+1\cdot5$	$h+2\cdot0$	$k+1\cdot5$	8·8	+·2	0	8 10
Apr. 15	5125	...	$e+1\cdot0$	$g+1\cdot5$	$h+2\cdot0$	$k+1\cdot7$	$l+2\cdot0$	8·5	+·3	0	9 50
Apr. 21	5131	...	$e+0\cdot7$	$g+1\cdot3$	$h+1\cdot7$	$k+1\cdot7$	$l+2\cdot0$	8·6	+·3	0	9 0
May 25	5165	...	$c-1\cdot5$	$e+0\cdot5$	$g+1\cdot3$	$h+1\cdot6$	...	8·8	+·2	+·1	9 30
June 2	5173	...	$c-1\cdot5$	$e+0\cdot7$	$g+1\cdot3$	$h+1\cdot6$	...	8·8	+·2	+·1	9 40
June 21	5192	...	$c-1\cdot3$	$e-1\cdot0$	$g+1\cdot0$	$h+1\cdot5$	$l+1\cdot3$	9·3	+·1	0	10 10
July 3	5204	...	$e-0\cdot5$	$g+0\cdot7$	$h+1\cdot3$	$k+1\cdot0$	$l+1\cdot5$	9·3	+·2	0	10 0
July 14	5215	...	$e-0\cdot5$	$g+0\cdot5$	$h+1\cdot0$	$=k$	$l+0\cdot5$	9·8	+·1	0	9 50
July 23	5224	...	$e-1\cdot0$	$=g$	$h+1\cdot0$	$=k$	$l+0\cdot5$	10·0	0	0	9 50
Aug. 7	5239	...	$e-1\cdot7$	$g-0\cdot3$	$h-1\cdot0$	$k+0\cdot6$	$l+0\cdot6$	10·5	0	0	9 50
Aug. 18	5250	...	$e-1\cdot5$	$g-1\cdot3$	$h-0\cdot5$	$k-0\cdot5$	$l-1\cdot0$	11·1	−·2	0	9 30
Sept. 4	5267	...	$e-1\cdot5$	$g-0\cdot7$	$h+0\cdot3$	$k+0\cdot5$	$l+0\cdot3$	10·3	0	0	10 0
Sept. 14	5277	...	$e-2\cdot0$	$g-1\cdot3$	$h-0\cdot7$	$k-0\cdot5$	$l-0\cdot7$	11·1	−·2	0	9 40
Sept. 25	5288	...	$e-2\cdot0$	$g-1\cdot2$	$h-0\cdot2$	$k-1\cdot5$	$l-0\cdot8$	11·2	−·2	0	10 0
Oct. 14	5307	...	$e-2\cdot0$	$g-1\cdot3$	$h-0\cdot7$	$=k$	$l-1\cdot0$	11·1	−·2	0	7 20
Oct. 27	5320	...	$e-1\cdot0$	$g-1\cdot0$	$=h$	$k+0\cdot8$	$l+1\cdot0$	10·1	0	0	9 50
Nov. 15	5339	...	$e-1\cdot0$	$g-0\cdot6$	$h+0\cdot4$	$k+0\cdot8$	$l+1\cdot2$	9·9	+·1	0	6 30
Dec. 15	5369	...	$e-1\cdot0$	$=g$	$h+1\cdot0$	$k+1\cdot0$	$l+1\cdot7$	9·6	+·1	0	9 10

R CASSIOPELÆ.

R. A. $23^h\ 53^m\ 19^s$. Dec. $+50°\ 49'\cdot9$ (1900·0).

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1887 June 8	0431	...	1+1·0	3+2·5	4+2·0	8+3·0	14+3·0	6·3	+·3	−·3	...
June 14	0437	...	1+1·0	2+2·0	3+2·0	4+2·7	...	6·0	+·3	−·5	...
July 5	0458	...	1+1·3	2+1·5	3+2·0	4+2·3	...	6·1	+·3	−·5	...
July 20	0473	...	1+0·8	2+1·0	3+2·5	4+3·0	...	6·1	+·3	−·5	...
Aug. 5	0489	...	1+1·0	2+1·5	3+1·8	4+2·0	...	6·3	+·3	−·5	...
Aug. 18	0502	...	=1	2+0·5	3+1·0	4+1·5	...	7·1	+·2	−·5	...
Sept. 19	0534	...	2−1·0	3−0·5	4+0·3	6+2·0	...	8·1	0	−·4	...
Oct. 14	0559	...	2−0·3	=3	4+0·5	8+2·0	14+2·0	7·8	+·1	−·3	...
Oct. 24	0569	...	3−1·0	6+1·5	8+2·0	12+2·0	14+2·5	7·7	+·2	−·2	...
Nov. 15	0591	...	4−1·0	6+1·0	8+1·5	14+1·5	...	8·3	+·2	−·2	...
Dec. 9	0615	...	6−0·5	7−0·5	=8	=12	14+0·5	9·4	−·1	−·1	...
1888 May 1	0759	...	8−1·0	14−1·0	...	...	...	10·5	−·2	−·1	...
May 11	0769	...	14−1·0	...	...	...	...	10·5	−·2	0	...
May 31	0789	...	6−1·0 14−0·3	7−1·0	8−0·5	α+1·0	12−0·8	9·9	−·2	−·1	...
June 26	0815	...	6−1·5	7−0·8	8−0·5	=14	α+1·5	9·8	−·1	−·1	...
July 11	0830	...	7+0·5	=8	13+1·0	14+0·5	...	8·9	+·2	−·1	...
July 26	0845	...	2−1·0 14+2·3	3+1·0	4−0·5	8+2·0	9+1·0	7·9	+·1	−·4	...
Aug. 13	0863	...	1−0·5	=2	3+1·0	4−0·5	...	7·9	−·1	−·5	...
Aug. 26	0876	...	1−0·5	2+0·5	3+0·5	4+1·0	9+2·5	7·3	+·2	−·5	...
Sept. 10	0891	..	=1	2+0·5	3+1·0	4+1·5	...	7·1	+·2	−·5	...
Sept. 21	0902	...	1−0·5	=2	3+0·5	4+1·5	...	7·5	+·1	−·5	...
Oct. 1	0912	...	1−0·5	=2	=3	4+1·0	...	7·8	0	−·5	...
Oct. 14	0925	...	1−1·0	2−0·5	=3	4+1·0	...	8·0	−·1	−·5	...
Nov. 11	0953	...	1−1·5	2−2·0	3−0·5	8+2·0	14+2·3	8·3	−·1	−·4	...
Dec. 6	0978	...	2−1·5	3−1·0	=4	8+2·0	...	8·5	−·1	−·4	...
1889 Jan. 1	1004	...	6+0·7 14+1·0	7+1·0	8+1·0	=9	12+1·0	8·5	+·3	−·2	...
Feb. 7	1041	...	6−0·2	7−0·2	=8	14+1·0	...	9·1	−·1	−·1	...
Mar. 11	1073	...	8−0·8	14−0·5	α+1·0	...	...	9·9	−·1	−·2	...
Mar. 27	1089	...	6−2·0	7−2·0	8−2·0	12−1·0	14−1·5	11·0	−·2	−·1	...
Apr. 27	1120	80	α−0·6	...	...	...	...	11·1	−·2	−·2	...
May 19	1142	132	α−1·0	...	...	...	...	11·5	−·2	−·2	...
June 4	1158	...	15−1·0	=16	17+0·3	18+0·3	α+0·3	10·8	+·1	−·1	−1·0
June 13	1167	...	α+1·0	...	...	...	...	9·5	+·3	−·2	−1·9
June 30	1184	...	6−1·0	7−0·7	8−1·0	14−0·5	α+1·0	9·5	−·2	−·1	−1·7
July 21	1205	...	6−1·0	=7	8+0·3	=12	14+0·5	9·3	+·1	−·1	− 8
Aug. 9	1224	...	=6	7+1·0	8+1·0	9−1·0	14+1·3	8·7	+·1	−·2	− 7
Aug. 24	1239	...	3−1·3	4−0·7	6+0·7	7+1·0	12+1·0	8·7	+·1	−·2	− ·1
Sept. 10	1256	...	3−1·5	4−0·5	6+1·0	9+0·5	12+1·0	8·7	+·1	−·3	+ ·5
Sept. 20	1266	...	2−1·0	3−0·5	4+0·5	6+1·0	7+1·0	8·2	+·1	−·3	+ 5
Oct. 5	1281	...	=1	2+1·0	3+2·0	4+3·0	...	6·4	+·2	−·5	− .6

R Cassiopeiæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1889 Oct. 12	1288	...	1+0·5 12+2·5	2+1·0	3+1·0	4+0·5	6+2·5	7·0	+·3	−·4	+ ·7
Oct. 19	1295	...	1+1·0	2+1·5	3+1·5	4+2·5	...	6·3	+·3	−·5	+ ·3
Oct. 24	1300	...	1+1·0	2+1·0	3+1·5	4+2·0	6+3·0	6·4	+·3	−·4	+ ·8
Nov. 6	1313	...	1+1·0	2+1·0	3+1·0	4+2·0	9+3·0	6·5	+·3	−·5	+ ·8
Nov. 27	1334	...	1+0·5 7+3·0	2+0·5	3+0·5	4+2·0	6+2·6	6·8	+·3	−·3	+ ·8
Dec. 7	1344	...	1−1·0 9+2·0	2+0·5	3+0·5	4+1·5	6+2·0	7·4	+·2	−·4	+ ·8
1890 Jan. 1	1369	...	2−0·5	=3	4+1·0	6+1·5	7+1·5	7·7	+·1	−·3	+ 3
Jan. 19	1387	...	3−0·5	4+0·5	6+1·0	8+1·7	14+2·0	7·9	+·2	−·2	+ ·1
Feb. 7	1406	...	3−1·0	=4	6+1·0	7+1·5	9+0·3	8·3	+·1	−·3	− ·3
Feb. 18	1417	...	2−1·3	6+1·0	7+1·5	8+1·5	9+0·7	8·2	+·2	−·3	− 6
Feb. 27	1426	...	2−1·5	4−0·5	6+0·7	7+1·0	9+0·5	8·6	+·1	−·3	− ·5
Mar. 18	1445	...	4−1·0	=6	7+0·4	8+0·8	14+1·2	8·8	+·1	−·1	− ·6
Apr. 2	1460	...	4−1·3 14+1·5	6+1·0	7+1·0	8+1·0	9−1·0	8·7	+·1	−·2	−1·1
May 5	1493	...	6−0·8	7−0·5	8−1·0	9−1·5	=14	10·0	−·2	−·2	− ·7
May 23	1511	...	8−2·0	14−1·5	15−0·5	α+0·5	...	10·7	−·1	0	− 2
June 15	1534	...	14−1·5	15−0·7	16+0·3	17+1·0	α+0·5	10·5	0	−·1	−1·0
July 15	1564	...	15−1·0	16−0·7	17−0·7	18+0·5	α−0·2	11·2	−·1	−·1	− ·7
Aug. 6	1586	...	16−0·5	=17	18+1·0	α+0·5	...	10·7	+·1	−·2	− ·9
Aug. 28	1608	...	8−1·7 α+1·0	14−1·3	=15	16+0·8	17+0·8	10·4	0	−·1	− ·9
Sept. 8	1619	...	8−1·0	14−0·5	15+0·5	16+1·0	17+1·0	10·0	0	−·1	−1·0
Sept. 25	1636	...	8−1·0	14−0·5	15+0·7	16+1·5	17+1·5	9·8	+·1	−·1	− ·7
Oct. 9	1650	...	6−1·0	7−0·7	8−0·5	12−0·7	14+0·5	9·8	−·2	−·1	− ·6
Oct 16	1657	...	6−0·5	7+1·0	8+0·8	=12	14+1·0	8·8	+·1	−·1	−1·0
Nov. 7	1679	...	4−1·0	6+0·6	7+1·0	8+1·0	14+1·0	8·6	+·2	−·1	+ 1
Nov. 26	1698	...	2−1·0	3−1·0	=4	6+1·7	7+2·0	8·1	0	−·3	+ ·8
Dec. 14	1716	...	=1	=2	3+0·6	4+1·2	9+2·0	7·3	+·2	−·5	+ ·8
1891 Jan. 7	1740	...	1+0·5	2+0·7	=3	4+1·0	...	7·3	+·2	−·5	+ ·8
Jan. 24	1757	...	1+0·7	2+1·0	3+1·3	4+2·0	9+2·5	6·6	+·3	−·5	+ 1
Feb. 5	1769	...	=1	2+1·2	3+1·0	4+2·0	9+2·5	6·8	+·2	−·5	0
Feb. 13	1777	...	1+1·0	2+1·7	3+1·5	4+2·0	...	6·3	+·3	−·5	− ·4
Feb. 18	1782	...	1−1·0	2−1·0	3+0·7	4+1·3	9+2·0	7·7	+·1	−·5	+ 6
Mar. 3	1795	...	1−0·5	2−0·5	=3	4+1·2	9+2·0	7·7	0	−·5	+ ·2
Mar. 19	1811	...	2−0·6	3−0·5	4+0·6	6+1·5	9+1·0	8·1	+·1	−·4	+ ·5
Apr. 4	1827	...	2−0·6	3+0·2	4+0·5	8+1·5	14+2·0	7·9	+·2	−·3	0
May 6	1859	...	4−0·5	6+1·0	7+1·3	8+1·3	=9	8·4	+·1	−·2	− 3
June 5	1889	...	3−1·8	4−1·2	7+0·5	8+0·5	14+1·0	9·1	+·1	−·2	− ·3
July 4	1918	...	7−0·6	8−1·0	14−0·3	15+1·3	17+1·8	9·7	−·1	0	− ·5
July 12	1926	...	6−0·8	7−1·2	8−0·5	=14	15+0·5	9·8	−·1	0	− ·
Aug. 10	1955	...	8−2·0	14−1·5	15+0·5	16+0·2	...	10·7	0	0	− ·4
Aug. 28	1973	...	8−1·6	14−1·3	=15	17+0·5	18+1·0	10·6	0	−·1	−1·1
Sept. 11	1987	...	15−0·2	16+0·3	17+0·3	18+0·5	α+0·3	10·6	+·1	−·1	−1·2
Sept. 28	2004	...	16−0·3	=17	18+0·3	α−0·3	...	11·1	0	−·2	− ·9
Oct. 23	2029	...	14−1·0	15+0·3	16+0·7	17+0·7	α+1·0	10·1	+·1	−·1	−1·6

R Cassiopeiæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1891 Oct. 30	2036	...	8−1·2	14−1·2	15+0·5	16+1·0	17+0·8	10·2	0	−·1	−1·6
Nov. 24	2061	...	8−1·0	14−0·3	15+1·0	17+2·3	18+2·0	9·5	+·1	−·1	−1·4
Dec. 20	2087	...	6−0·6	=7	8−0·3	=12	14+0·3	9·4	−·1	−·1	− ·3
1892 Feb. 1	2130	...	2−1·0 14+1·5	3+0·5	4+1·0	8+1·5	9+1·0	7·8	+·2	−·4	+ ·7
Feb. 23	2152	...	1+1·0	2+2·0	3+2·0	4+3·0	9+3·5	5·8	+·3	−·5	(− ·1)
Mar. 1	2159	...	1+1·0	2+1·5	3+1·5	4+2·0	9+3·0	6·3	+·3	−·5	(+ ·6)
Mar. 8	2166	...	1+1·0	2+1·5	3+1·0	4+2·0	9+2·5	6·5	+·3	−·5	(+ ·9)
Mar. 18	2176	...	1+1·0	2+1·5	3+1·5	4+2·3	9+3·0	6·2	+·3	−·5	(+ ·6)
Mar. 31	2189	...	1+1·0	2+1·5	3+1·0	4+2·0	9+2·5	6·5	+·3	−·5	(+ ·8)
Apr. 15	2204	...	1+0·5	2+0·5	3+1·0	4+1·5	9+2·0	7·0	+·3	−·5	+1·0
May 20	2239	...	1+0·5	=2	3−0·5	4+1·0	9+2·0	7·5	+·1	−·5	+ ·5
June 8	2258	...	1−1·0	2+0·3	3−0·4	4+1·3	8+2·0	7·8	+·1	−·4	+ ·5
June 23	2273	...	2−1·0	3−0·5	4+0·6	8+1·7	9+1·3	8·1	+·1	−·4	+ ·3
June 30	2280	...	2−1·0	=3	7+1·5	8+1·5	9+0·8	8·1	+·1	−·4	+ ·1
July 11	2291	...	8+1·5	9+1·0	14+1·5	...	...	8·1	+·3	−·3	+ ·1
July 27	2307	...	2−1·5	6+1·0	7+1·3	8+1·3	14+1·6	8·2	+·2	−·2	− ·2
Aug. 17	2328	...	=6	7+0·3	8+1·0	9−1·0	14+1·3	8·9	+·1	−·2	− ·3
Sept. 2	2344	...	=6	=7	8+0·3	9−0·5	14+1·0	9·0	+·1	−·2	− ·7
Sept. 14	2356	...	8−0·3	14−0·6	15+1·0	16+1·5	17+1·7	9·5	+·1	−·1	− ·4
Oct. 7	2379	...	8−2·0	14−1·5	15+0·5	16+1·0	17+1·0	10·4	0	−·1	− ·4
Oct. 18	2390	...	14−1·3	=15	=16	17+1·0	18+1·3	10·4	0	−·1	− ·8
Nov. 9	2412	...	15−0·5	16−0·5	=17	18−1·0	=*a*	11·2	−·1	−·1	− ·7
Dec. 4	2437	80	15−1·5	16−0·7	=17	=18	*a*−0·5	11·3	−·1	−·1	− ·7
Dec. 12	2445	...	14−1·5	15−1·5	17−0·5	18−0·5	=*a*	11·3	−·2	0	− ·6
Dec. 28	2461	...	14−1·5	15−0·6	=17	18+0·5	*a*+0·7	10·7	0	0	− ·7
1893 Jan. 11	2475	...	*o*−2·0	*p*−0·5	=*q*	*r*+0·5	*s*+0·5	11·2	0	−·1	0
Jan. 18	2482	...	*o*−2·0	*p*−0·5	*q*+0·3	*r*+0·7	*s*+1·0	11·0	0	−·1	− ·1
Feb. 4	2499	...	*o*−1·0	*p*−0·5	=*q*	*r*+1·0	=*s*	11·0	0	−·1	+ ·4
Feb. 11	2506	...	*n*−1·3	*o*−0·6	*p*+0·4	*q*+1·5	*r*+1·5	10·1	0	−·1	− ·3
Mar. 4	2527	...	*k*−2·0	*l*−1·0	*n*−1·0	*o*−0·3	*p*+1·0	9·8	−·1	−·1	+ ·6
Mar. 11	2534	...	*k*−2·0	*l*−1·3	*n*−0·3	*o*+0·3	*p*+1·0	9·6	0	−·1	+1·2
Mar. 20	2543	...	*k*−2·0	*l*−1·0	*n*+1·0	*o*+1·3	*p*+2·0	8·7	0	−·1	+ ·8
Apr. 3	2557	...	*g*−0·3	*h*−0·3	=*k*	*l*+1·0	*n*+2·0	7·3	0	+·1	+ ·4
Apr. 11	2565	...	*g*+0·7	*h*+0·7	*k*+1·2	*l*+2·0	*o*+3·0	6·4	+·2	+·1	+ ·1
May 4	2588	...	*g*+1·0	*h*+1·0	*k*+2·0	*l*+2·6	...	5·7	+·2	+·1	(− ·3)
May 11	2595	...	*g*+1·5	*h*+1·8	*k*+1·8	*l*+2·3	*o*+3·0	5·8	+·2	+·1	(− ·2)
May 21	2605	...	*g*+2·5	*h*+2·0	*k*+2·5	*l*+3·0	*n*+4·0	5·0	+·2	+·1	(−1·1)
May 26	2610	...	*g*+1·3	*h*+1·3	*k*+1·6	*l*+2·3	*n*+3·0	5·9	+·2	+·1	(− ·2)
June 7	2622	...	*g*+0·8	*h*+0·6	*k*+1·3	*l*+1·8	*o*+2·5	6·5	+·2	+·1	(+ ·1)
June 12	2627	...	*g*−0·5	*h*−0·5	=*k*	*l*+1·0	*n*+2·0	7·4	0	+·1	(+ ·6)

R Cassiopeiæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1893 July 25	2670	...	$g-1\cdot0$	$h-1\cdot5$	$k-1\cdot0$	$l+1\cdot0$	$n+2\cdot0$	7·9	0	+·1	(+ ·4)
Aug. 13	2689	...	$h-1\cdot2$	$k-1\cdot2$	$=l$	$n+1\cdot2$	$o+1\cdot2$	8·4	0	0	(+ ·4)
Aug. 28	2704	...	$h-1\cdot3$	$k-1\cdot0$	$l-0\cdot6$	$n+1\cdot3$	$o+1\cdot6$	8·4	0	0	+ ·1
Sept. 9	2716	...	$h-2\cdot0$	$k-1\cdot0$	$=l$	$n+2\cdot0$	$o+2\cdot0$	8·2	0	0	− ·4
Sept. 24	2731	...	$k-1\cdot5$	$l-1\cdot0$	$n+1\cdot3$	$o+1\cdot0$	$p+2\cdot0$	8·7	0	−·1	− ·3
Oct. 12	2749	...	$l-1\cdot5$	$n+1\cdot0$	$o+0\cdot5$	$p+1\cdot5$	$r+2\cdot0$	9·2	+·1	−·1	− ·2
Oct. 30	2767	...	$n-0\cdot6$	$o-0\cdot3$	$p+1\cdot5$	$q+2\cdot0$	$r+2\cdot3$	9·3	0	−·1	− ·7
Nov. 8	2776	...	$n-0\cdot5$	$=o$	$p+1\cdot0$	$q+1\cdot5$	$r+1\cdot5$	9·7	+·1	−·1	− ·5
Dec. 9	2807	...	$n-2\cdot5$	$o-1\cdot3$	$p-0\cdot6$	$q+1\cdot0$	$r+1\cdot0$	10·9	0	−·1	− ·4
Dec. 30	2828	...	$n-2\cdot3$	$p-1\cdot0$	$=q$	$=r$	$s+1\cdot0$	11·3	0	−·1	− ·5
1894 Jan. 20	2849	...	$o-2\cdot3$	$p-1\cdot3$	$q-0\cdot5$	$r+0\cdot2$	$s+0\cdot5$	11·6	0	−·1	− ·5
Jan. 28	2857	...	$p-1\cdot5$	$q-0\cdot5$	$r+0\cdot2$	$=s$	...	11·6	0	−·1	− ·5
Feb. 8	2868	80	$o-2\cdot0$	$p-1\cdot0$	$q-0\cdot5$	$r-0\cdot5$	$s-0\cdot5$	11·8	−·1	−·1	− ·3
Feb. 18	2878	...	$p-1\cdot0$	$q-0\cdot5$	$r+0\cdot5$	$=s$	...	11·4	0	−·1	− ·5
Mar. 2	2890	...	$n-2\cdot5$	$p-1\cdot0$	$q+0\cdot5$	$r+1\cdot0$	$s+0\cdot7$	11·1	0	−·1	− ·6
Mar. 15	2903	...	$o-1\cdot5$	$p-0\cdot7$	$q+0\cdot5$	$r+0\cdot7$	$s+1\cdot3$	10·8	0	−·1	− ·6
Mar. 24	2912	...	$o-1\cdot3$	$p-0\cdot3$	$q+0\cdot5$	$r+1\cdot0$	$s+1\cdot0$	10·7	0	−·1	− ·5
Apr. 12	2931	...	$n-2\cdot0$	$o-1\cdot0$	$p+1\cdot0$	$q+2\cdot0$	$r+1\cdot5$	10·1	0	−·1	− ·5
May 3	2952	...	$l-2\cdot0$	$n-1\cdot0$	$=o$	$p+1\cdot5$	$r+2\cdot0$	9·8	0	−·1	+ ·1
May 24	2973	...	$h-2\cdot0$ $r+2\cdot4$	$k-1\cdot5$	$l-0\cdot5$	$n+0\cdot7$	$o+1\cdot3$	8·8	0	−·1	+ ·3
June 13	2993	...	$g-1\cdot0$	$h-0\cdot3$	$=k$	$l+1\cdot3$	$n+2\cdot0$	7·4	0	+·1	+ ·3
June 27	3007	...	$g+1\cdot3$	$h+1\cdot3$	$k+1\cdot5$	$l+2\cdot0$	$n+3\cdot0$	6·0	+·2	+·1	0
July 7	3017	...	$g+1\cdot0$	$h+1\cdot3$	$k+1\cdot6$	$l+2\cdot0$	...	5·9	+·2	+·1	+ ·3
July 27	3037	...	$g+1\cdot0$	$h+1\cdot0$	$k+1\cdot2$	$l+1\cdot5$	$o+3\cdot0$	6·4	+·2	+·1	+1·3
Aug. 27	3068	...	$g-0\cdot7$	$h+0\cdot5$	$k+0\cdot5$	$l+1\cdot0$	$n+2\cdot0$	7·1	+·1	+·1	+1·2
Sept. 11	3083	...	$g-0\cdot5$	$h+0\cdot4$	$k+0\cdot4$	$l+0\cdot7$	$n+1\cdot5$	7·3	+·1	+·1	+1·1
Sept. 30	3102	...	$=g$	$h-0\cdot5$	$k+0\cdot5$	$l+1\cdot0$	$n+1\cdot3$	7·3	+·1	+·1	+ ·7
Oct. 21	3123	...	$g-1\cdot0$	$=h$	$=k$	$l+1\cdot0$	$n+1\cdot5$	7·5	0	+·1	+ ·3
Nov. 16	3149	...	$g-0\cdot6$	$h-0\cdot6$	$k-0\cdot3$	$l+0\cdot3$	$n+1\cdot5$	7·7	0	+·1	0
Nov. 30	3163	...	$h-1\cdot0$	$=k$	$l+0\cdot5$	$n+1\cdot6$	$o+1\cdot3$	8·0	+·1	0	0
Dec. 8	3171	...	$h-1\cdot0$	$=l$	$n+1\cdot3$	$o+1\cdot3$	$r+2\cdot5$	8·4	+·1	−·1	+ ·2
1895 Jan. 23	3217	...	$h-2\cdot0$	$n+0\cdot7$	$o+0\cdot7$	$p+1\cdot3$	$r+2\cdot3$	9·0	+·1	−·1	− ·2
Feb. 16	3241	...	$n-1\cdot0$	$o-1\cdot0$	$p+1\cdot0$	$q+2\cdot0$	$r+2\cdot0$	9·8	0	−·1	(0)
Mar. 4	3257	...	$n-1\cdot3$	$=p$	$q+1\cdot0$	$r+1\cdot0$	$s+1\cdot3$	10·4	0	−·1	(+ ·1)
Mar. 18	3271	80	$=q$	$=r$	...	...	...	11·2	0	0	(+ ·7)
Apr. 11	3295	80	$o-1\cdot6$	$p-1\cdot2$	$q-0\cdot3$	$r-0\cdot3$	$s-0\cdot3$	11·6	−·1	−·1	(+ ·3)
May 9	3323	80	$n-3\cdot0$	$o-2\cdot0$	$p-0\cdot5$	$=q$	$=r$	11·5	−·1	−·1	− ·3
May 16	3330	132	$p-1\cdot0$	$q-1\cdot0$	$r-0\cdot3$	$s+0\cdot5$	...	11·6	−·1	−·1	− ·4
June 2	3347	...	$o-1\cdot5$	$p-0\cdot3$	$q+0\cdot8$	$r+1\cdot0$	$s+1\cdot2$	10·7	0	−·1	(− ·6)
June 24	3369	...	$l-1\cdot4$	$n-1\cdot0$	$o-0\cdot3$	$p+1\cdot0$	$r+1\cdot0$	10·0	0	−·1	(− ·9)
July 7	3382	...	$n-0\cdot8$	$o-0\cdot3$	$p+1\cdot0$	$q+1\cdot3$	$r+1\cdot3$	9·9	0	−·1	− ·6
Aug. 6	3412	...	$k-2\cdot5$	$l-1\cdot0$	$n+0\cdot5$	$o+0\cdot5$	$r+1\cdot5$	9·4	0	−·1	0
Aug. 17	3423	...	$k-1\cdot0$	$l-0\cdot3$	$n+1\cdot2$	$o+1\cdot0$	$p+2\cdot0$	8·5	0	−·1	− ·3
Aug. 31	3437	...	$h-0\cdot5$	$k+0\cdot2$	$l+1\cdot0$	$n+1\cdot3$	$o+1\cdot3$	7·7	+·1	0	+ ·4
Sept. 18	3455	...	$g+1\cdot0$ $o+2\cdot0$	$h+1\cdot0$	$k+1\cdot3$	$l+1\cdot5$	$n+2\cdot0$	6·6	+·2	0	+ ·4

R Cassiopeiæ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1895 Sept. 26	3463	...	$g+0.5$	$h+0.5$	$k+1.0$	$l+1.5$	$n+2.0$	6·7	+·2	+·1	+ ·9
Oct. 10	3477	...	$g+1.0$	$h+1.0$	$k+1.5$	$l+2.0$	...	6·0	+·2	+·1	+ ·3
Oct. 17	3484	...	$g-0.5$	$h+1.0$	$k+1.0$	$l+1.3$	...	6·7	+·1	+ 1	+1 0
Oct. 23	3490	...	$g-0.5$	$h+0.3$	$k+1.0$	$l+1.3$	...	6·9	+·1	+·1	+1·2
Nov. 1	3499	...	$=g$	$h+0.5$	$k+0.8$	$l+1.3$	$n+1.5$	7·0	+·2	+·1	+1·2
Nov. 13	3511	...	$g+0.5$	$h+0.7$	$k+0.5$	$l+1.0$	$n+1.5$	7·0	+·2	+·1	+1·0
Dec. 31	3559	...	$h-1.0$	$k+1.0$	$=l$	$n+1.5$	$o+2.0$	7·7	+·1	0	+ ·2
1896 Jan. 9	3568	...	$h-1.0$	$k-0.5$	$l+0.3$	$n+1.3$	$o+1.3$	8·1	0	0	+ ·3
Feb. 1	3591	...	$h-1.0$	$k-0.6$	$=l$	$n+1.0$	$o+1.0$	8·3	0	0	0
Feb. 22	3612	...	$h-1.3$	$k-1.0$	$l-0.5$	$n+1.0$	$o+1.0$	8·6	0	0	− ·2
Mar. 16	3635	...	$h-1.8$	$k-1.3$	$l-0.6$	$n+0.6$	$o+1.0$	8·8	0	0	− ·6
Apr. 2	3652	...	$k-2.0$	$l-1.0$	$n+0.2$	$o+0.5$	...	9·4	0	−·1	− ·5
Apr. 21	3671	...	$n-1.2$	$=o$	...	...	...	10·2	0	−·2	− ·2
May 3	3683	...	$n-1.0$	$=o$	$p+1.0$	$r+1.0$	$s+1.3$	10·1	0	−·1	− ·6
May 19	3699	...	$n-1.5$	$o-1.0$	$=p$	...	...	10·8	−·1	−·1	− ·4
May 31	3711	80	$n-1.8$	$o-1.0$	$p-0.3$	$q+0.3$	$r+0.7$	10·7	0	−·1	− ·5
June 21	3732	80	$l-2.0$	$n-1.5$	$o-1.2$	$p-0.3$	$r+0.5$	10·8	−·1	−·1	− ·7
July 12	3753	...	$n-1.5$	$o-1.0$	$=p$	$q+1.0$	$r+0.6$	10·6	0	−·1	− ·8
July 26	3767	...	$l-1.6$	$n-1.3$	$o-1.0$	$=p$	$r+0.7$	10·5	0	−·1	− ·8
Aug. 6	3778	...	$l-1.7$	$n-1.3$	$o-1.0$	$p+0.6$	$r+1.2$	10·3	0	−·1	−1·0
Aug. 18	3790	...	$l-1.5$	$n-1.0$	$o-0.3$	$p+0.5$	$r+1.0$	10·2	0	−·1	− ·9
Sept. 16	3819	...	$n-1.0$	$=o$	$p+0.8$	$q+1.2$	$r+1.2$	10·0	0	−·1	− ·7
Sept. 27	3830	...	$n-0.3$	$o-0.3$	$p+1.0$	$q+2.0$	$r+2.0$	9·5	0	−·1	− ·9
Oct. 12	3845	...	$k-1.3$	$l-0.7$	$n+0.7$	$o+0.7$	$p+1.3$	9·0	0	−·1	− ·9
Oct. 28	3861	...	$n+1.0$	$o+1.0$	$p+1.6$	$q+1.6$	$r+2.0$	9·0	+·2	−·1	+ ·2
Nov. 12	3876	...	$g-1.0$	$h+0.5$	$k+0.5$	$n+1.5$	$o+1.5$	7·5	+·1	0	− ·2
Dec. 9	3903	...	$g+1.0$	$h+1.0$	$k+1.5$	$l+1.8$	$n+2.5$	6·2	+·2	+·1	+ ·3
1897 Jan. 1	3926	...	$g+1.0$	$h+1.5$	$k+1.5$	$l+2.0$	$o+3.0$	6·1	+·2	+·1	+ ·7
Jan. 26	3951	...	$g+1.0$	$h+1.0$	$k+1.5$	$l+2.0$	$n+2.5$	6·2	+·2	+·1	+ ·7
Feb. 7	3963	...	$g-0.3$	$h+0.4$	$k+0.4$	$l+1.3$	$n+2.0$	7·0	+·1	+·1	+1·3
Feb. 17	3973	...	$g+0.7$	$h+1.0$	$k+1.0$	$l+1.4$	$p+3.0$	6·6	+·2	+·1	+ ·9
Mar. 15	3999	...	$h-0.8$	$k-0.4$	$l+0.3$	$n+1.2$	$o+1.2$	8·1	0	0	(+1·6)
Apr. 23	4038	...	$h-1.2$	$k-1.0$	$=l$	$n+1.7$	$o+2.0$	8·1	0	0	(+ ·6)
May 13	4058	...	$h-1.5$	$k-1.0$	$l-0.5$	$n+1.0$	$o+1.3$	8·5	0	0	(+ ·3)
May 22	4067	...	$h-1.7$	$k-1.2$	$l-0.3$	$n+1.0$	$o+1.0$	8·6	0	0	(+ ·3)
June 4	4080	...	$h-2.5$	$k-2.0$	$l-1.0$	$n+0.3$	$o+1.0$	9·2	0	0	+ ·4
June 16	4092	...	$l-1.0$	$n+0.4$	$o+1.0$	$p+1.3$	$r+2.0$	9·2	+·1	−·1	+ ·1
June 20	4096	...	$l-1.2$	$n+0.2$	$o+1.0$	$p+1.4$	$r+2.0$	9·2	+·1	−·1	0
July 11	4117	...	$l-1.4$	$n-1.0$	$o+0.2$	$p+1.0$	$r+1.3$	9·9	0	−·1	0
July 29	4135	...	$\{n-1.0$ $s+1.3$	$o-0.3$	$p+0.6$	$q+1.0$	$r+1.0\}$	10·2	0	−·1	− ·2
Sept. 3	4171	...	$n-1.5$	$o-0.8$	$=p$	$r+0.6$	$s+0.6$	10·8	0	−·2	− ·6
Sept. 14	4182	...	$o-1.2$	$p-0.3$	$q+0.7$	$r+0.7$	$s+1.0$	10·7	0	−·1	− ·6
Sept. 26	4194	...	$n-2.0$	$p-0.3$	$q+1.0$	$r+1.0$	$s+1.3$	10·6	0	−·1	− ·6
Oct. 27	4225	...	$n-0.5$	$p+1.0$	$r+1.7$	$s+1.7$	...	9·8	+·1	−·2	− ·7
Nov. 18	4247	...	$h-2.0$	$n+0.5$	$=o$	$p+1.5$	$r+2.0$	9·2	+·1	−·1	− ·6
Dec. 3	4262	...	$l-1.0$	$n+1.0$	$o+1.0$	$p+1.7$	$r+2.0$	9·0	+·1	−·1	− ·5

R Cassiopeiæ —*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1897 Dec. 24	4283	...	$k-1\cdot0$	$=l$	$n+1\cdot3$	$o+1\cdot3$	$p+2\cdot0$	8·4	+·1	−·1	− ·7
1898 Feb. 6	4327	...	$g+1\cdot5$	$h+1\cdot5$	$k+1\cdot5$	$l+2\cdot5$	$n+3\cdot0$	5·8	+·3	+·1	...
Feb. 20	4341	...	$g+1\cdot5$	$h+2\cdot0$	$k+2\cdot5$	$l+3\cdot0$	$o+4\cdot0$	5·2	+·3	+·1	...
Feb. 26	4347	...	$g+1\cdot5$	$h+2\cdot0$	$k+2\cdot0$	$l+3\cdot0$	$o+3\cdot5$	5·4	+·3	+·1	...
Mar. 7	4356	...	$g+1\cdot5$	$h+2\cdot0$	$k+2\cdot0$	$l+3\cdot0$	$n+3\cdot5$	5·4	+·3	+·1	...
Mar. 14	4363	...	$g+2\cdot0$	$h+2\cdot5$	$k+3\cdot0$	$l+3\cdot5$	$n+3\cdot5$	4·9	+·3	+·1	...
Mar. 20	4369	...	$g+2\cdot0$	$h+2\cdot5$	$k+2\cdot5$	$l+3\cdot0$	$n+4\cdot0$	5·0	+·3	+·1	...
Mar. 29	4378	...	$g+1\cdot5$	$h+2\cdot0$	$k+2\cdot0$	$l+3\cdot0$	$n+4\cdot0$	5·3	+·3	+·1	...
Apr. 8	4388	...	$g+0\cdot7$	$h+0\cdot7$	$k+1\cdot0$	$l+1\cdot5$	$n+3\cdot0$	6·4	+·3	+·1	...
Apr. 22	4402	...	$g+1\cdot5$	$h+1\cdot3$	$k+1\cdot5$	$l+2\cdot3$	$n+3\cdot0$	5·9	+·3	+·1	...
May 5	4415	...	$g-1\cdot0$	$h+1\cdot0$	$k+0\cdot5$	$l+1\cdot3$	$n+2\cdot3$	7·0	+·2	+·1	...
May 28	4438	...	$h-1\cdot3$	$k-1\cdot0$	$=l$	$n+2\cdot0$	$o+2\cdot5$	8·0	0	0	0
June 10	4451	...	$h-1\cdot2$	$k-0\cdot9$	$l+0\cdot5$	$n+1\cdot0$	$o+1\cdot7$	8·2	+·1	0	− ·1
June 22	4463	...	$g-1\cdot3$	$h-1\cdot3$	$k-1\cdot3$	$l-0\cdot7$	$n+1\cdot3$	8·5	−·2	+·1	− ·3
July 2	4473	...	$h-2\cdot0$	$k-1\cdot3$	$n+1\cdot3$	$o+1\cdot3$	$p+2\cdot0$	8·6	+·1	0	− ·3
July 11	4482	...	$h-1\cdot7$	$k-1\cdot7$	$l-1\cdot3$	$n+1\cdot3$	$o+1\cdot3$	8·8	−·1	0	− ·6
July 30	4501	...	$h-2\cdot3$	$l-1\cdot3$	$n+1\cdot0$	$o+1\cdot5$	$p+2\cdot0$	8·8	+·1	−·1	−1·0
Aug. 16	4518	...	$n-1\cdot0$	$o-0\cdot2$	$p+1\cdot0$	$r+2\cdot0$	$s+2\cdot0$	9·8	+·1	−·2	− ·6
Sept. 10	4543	...	$o-1\cdot3$	$p+0\cdot7$	$q+1\cdot0$	$r+1\cdot0$	$s+1\cdot3$	10·4	+·1	−·1	− ·5
Sept. 26	4559	...	$n-2\cdot0$	$o-1\cdot3$	$p-0\cdot8$	$q+0\cdot2$	$r+0\cdot2$	11·1	0	−·1	− ·3
Oct. 9	4572	...	$n-1\cdot7$	$p-0\cdot5$	$q-0\cdot5$	$r-0\cdot5$	$=s$	11·4	−·2	−·1	− ·7
Oct. 19	4582	80	$n-2\cdot0$	$p-0\cdot5$	$q+0\cdot5$	$=r$	$s+0\cdot5$	11·1	0	−·1	−1·2
Oct. 30	4593	132	$p-1\cdot0$	$q-1\cdot0$	$r-1\cdot5$	$=s$	...	12·1	−·1	−·1	− ·5
Nov. 9	4603	132	$p-1\cdot7$	$q-1\cdot0$	$r-2\cdot0$	$s-0\cdot3$	...	12·5	−·2	−·1	− ·4
Dec. 7	4631	132	$p-2\cdot0$	$q-1\cdot0$	$r-2\cdot5$	$s-1\cdot0$	...	12·8	−·2	−·1	− ·1
Dec. 19	4643	...	$p-1\cdot5$	$q-1\cdot0$	$r-1\cdot5$	$s-1\cdot0$	...	12·4	−·2	−·1	− ·3
Dec. 28	4652	...	$n-3\cdot0$	$p-1\cdot0$	$q-0\cdot5$	$=r$	$s+0\cdot5$	11·6	−·1	−·1	− ·9
1899 Jan. 23	4678	...	$n-2\cdot0$	$o-1\cdot2$	$=p$	$r+1\cdot0$	$s+1\cdot0$	10·8	0	−·2	−1·1
Feb. 2	4688	...	$o-1\cdot5$	$=p$	$q+1\cdot0$	$r+1\cdot0$	$s+1\cdot0$	10·6	+·1	−·1	− ·7
Feb. 16	4702	...	$n-2\cdot0$	$o-1\cdot0$	$=p$	$q+1\cdot0$	$r+1\cdot3$	10·5	0	−·1	− ·6
Feb. 24	4710	...	$n-2\cdot0$	$o-1\cdot0$	$p+1\cdot0$	$q+1\cdot0$	$r+1\cdot6$	10·3	0	−·1	− ·5
Mar. 10	4724	...	$l-2\cdot0$	$n-1\cdot3$	$o-0\cdot5$	$p+0\cdot5$	$r+1\cdot3$	10·3	0	−·1	+ ·1
Mar. 17	4731	...	$k-3\cdot0$	$l-2\cdot0$	$n-0\cdot3$	$o+0\cdot5$	$p+1\cdot2$	9·8	−·1	−·1	− ·2
Apr. 17	4762	...	$n+2\cdot0$	$o+2\cdot5$	$p+3\cdot0$	...	...	7·4	+·3	−·1	(+ ·7)
May 2	4777	...	$g+0\cdot3$	$h+1\cdot0$	$k+1\cdot0$	$l+2\cdot0$	$n+3\cdot5$	6·2	+·3	+·1	(+ ·7)
May 22	4797	...	$g+1\cdot0$	$h+1\cdot0$	$k+1\cdot7$	$l+2\cdot3$	$n+3\cdot5$	5·9	+·3	+·1	(+ ·8)
June 3	4809	...	$g+1\cdot3$	$h+1\cdot3$	$k+1\cdot7$	$l+2\cdot3$	$n+3\cdot5$	5·8	+·3	+·1	(+ ·7)
June 8	4814	...	$g+1\cdot0$	$h+1\cdot0$	$k+1\cdot7$	$n+2\cdot5$	$o+3\cdot0$	6·3	+·3	0	(+1·0)
June 14	4820	...	$g+1\cdot3$	$h+1\cdot0$	$k+1\cdot5$	$l+2\cdot0$	$o+3\cdot0$	6·1	+·3	+·1	(+ ·8)
June 23	4829	...	$g+0\cdot5$	$h+1\cdot0$	$k+1\cdot5$	$l+2\cdot0$	$n+3\cdot0$	6·2	+·3	+·1	(+ ·6)
July 4	4840	...	$=g$	$=h$	$k+1\cdot0$	$l+2\cdot0$	$n+3\cdot0$	6·6	+·2	+·1	(+ ·7)
July 27	4863	...	$g-1\cdot0$	$h-1\cdot0$	$k-0\cdot3$	$l+0\cdot5$	$n+2\cdot3$	7·7	−·1	+·1	+ ·9
Aug. 11	4878	...	$g-1\cdot3$	$h-1\cdot0$	$k-0\cdot5$	$l+1\cdot0$	$n+2\cdot0$	7·8	−·1	+·1	+ ·6
Aug. 19	4886	...	$h-1\cdot3$	$k-0\cdot8$	$l+0\cdot3$	$n+2\cdot0$	$o+2\cdot0$	8·0	+·1	0	+ ·7
Aug. 26	4893	...	$h-1\cdot5$	$k-0\cdot5$	$l+0\cdot5$	$n+2\cdot0$	$o+1\cdot7$	8·0	+·1	0	+ ·6
Sept. 7	4905	...	$k-1\cdot3$	$=l$	$n+1\cdot5$	$o+1\cdot3$	$p+2\cdot3$	8·3	+·1	−·1	+ ·6

R CASSIOPEIÆ—*continued.*

Date.	Julian Day.	Power.	Comparisons.					Deduced Magnitude.	Corrections.		Apparent Correction to Harvard.
									Scale.	Stars.	
1899 Sept. 16	4914	...	$h-2\cdot3$	$l-1\cdot0$	$n+1\cdot3$	$o+1\cdot5$	$p+2\cdot0$	8·7	+·1	−·1	+·6
Sept. 27	4925	...	$h-2\cdot3$	$k-1\cdot5$	$l-1\cdot0$	$n+1\cdot3$	$o+1\cdot3$	8·8	−·1	0	+·2
Oct. 5	4933	...	$n+1\cdot0$	$o+1\cdot0$	$p+1\cdot7$	$q+2\cdot3$	$s+3\cdot0$	8·7	+·3	−·1	−·1
Oct. 12	4940	...	$n-1\cdot0$	$o-0\cdot5$	$p+1\cdot0$	$q+2\cdot0$	$r+2\cdot0$	9·7	+·1	−·1	+·3
Oct. 24	4952	...	$n-1\cdot2$	$o-0\cdot2$	$p+1\cdot5$	$q+2\cdot0$	$s+3\cdot0$	9·5	+·1	−·1	−·4
Nov. 19	4978	...	$n-2\,2$	$o-1\cdot5$	$p+0\cdot2$	$q+1\cdot0$	$r+1\cdot0$	10·7	0	−·1	−·4
Dec. 9	4998	...	$o-2\cdot0$	$p-1\cdot2$	$=q$	$r-0\cdot2$	$=s$	11·6	−·1	−·1	−·4
Dec. 30	5019	...	$n-2\cdot5$	$p-1\cdot5$	$=q$	$=r$	$s-0\cdot5$	11·7	−·1	−·1	...
1900 Jan. 9	5029	...	$o-2\cdot0$	$p-1\cdot3$	$q-0\cdot2$	$r+0\cdot5$	$=s$	11·5	−·1	−·1	...
Jan. 27	5047	80	$o-2\cdot0$	$p-1\cdot5$	$q-0\cdot7$	$r-1\cdot0$	$s-0\cdot7$	12·1	−·2	−·1	...
Feb. 17	5068	132	$n-3\cdot0$	$p-2\cdot3$	$q-2\cdot0$	$r-1\cdot5$	$s-1\cdot0$	12·8	−·2	−·1	...
											G.M.T. h m
Mar. 26	5105	132	$p-3\cdot0$	$q-2\cdot0$	$r-3\cdot0$	$s-2\cdot0$	...	13·7	−·2	−·1	10 0
Apr. 16	5126	132	$n-3\cdot0$	$p-1\cdot4$	$q-0\cdot8$	$r-1\cdot2$	$s-0\cdot8$	12·2	−·2	−·1	9 30
May 25	5165	...	$o-1\cdot3$	$=p$	$q+1\cdot0$	$r+1\cdot0$	$s+1\cdot0$	10·6	+·1	−·1	10 0
June 21	5192	...	$k-2\cdot3$	$l-1\cdot5$	$n+1\cdot0$	$o+1\cdot3$	$p+1\cdot5$	9·1	+·1	−·1	10 20
July 3	5204	...	$k-1\cdot0$	$=l$	$n+1\cdot5$	$o+1\cdot5$	$p+2\cdot0$	8·3	+·1	−·1	10 10
July 14	5215	...	$h-1\cdot0$	$k-0\cdot8$	$=l$	$n+2\cdot0$	$o+1\cdot7$	8·0	0	0	10 0
July 23	5224	...	$h-0\cdot5$	$k-1\cdot0$	$=l$	$n+2\cdot0$	$o+2\cdot0$	7·9	0	0	10 20
Aug. 9	5241	...	$g-1\cdot0$	$h-0\cdot5$	$k+1\cdot5$	$l+2\cdot0$	$n+2\cdot0$	6·9	+·1	+·1	9 30
Aug. 16	5248	...	$g-1\cdot3$	$h-1\cdot0$	$=k$	$l+1\cdot0$	$n+2\cdot5$	7·6	0	+·1	9 20
Aug. 30	5262	...	$h-1\cdot5$	$k-1\cdot0$	$l+0\cdot3$	$n+1\cdot7$	$o+1\cdot7$	8·2	+·1	0	9 50
Sept. 8	5271	...	$k-2\cdot0$	$l-1\cdot0$	$n+1\cdot5$	$p+2\cdot0$	$r+2\cdot5$	8·8	+·1	0	9 30
Sept. 15	5278	...	$h-1\cdot5$	$k-1\cdot0$	$l-0\cdot3$	$n+1\cdot5$	$p+2\cdot0$	8·4	−·1	0	9 20
Sept. 25	5288	...	$h-2\cdot0$	$n+2\cdot0$	$o+1\cdot7$	$p+2\cdot5$	$q+3\cdot0$	8·2	+·2	0	9 30
Oct. 14	5307	...	$h-2\cdot0$	$n+1\cdot0$	$o+1\cdot0$	$p+2\cdot0$	$q+3\cdot0$	8·6	+·2	0	7 30
Nov. 2	5326	...	$n+0\cdot6$	$o+0\cdot5$	$p+1\cdot7$	$q+2\cdot0$	$r+2\cdot0$	9·0	+·3	−·1	6 50
Nov. 15	5339	...	$n-0\cdot2$	$o-0\cdot6$	$p+1\cdot5$	$q+1\cdot5$	$r+2\cdot5$	9·5	+·1	−·1	7 0
Dec. 15	5369	...	$o-1\cdot0$	$p-0\cdot7$	$q+1\cdot0$	$r+0\cdot7$	$s+1\cdot0$	10·7	0	−·1	6 10

XII. *Radiation in the Solar System: its Effect on Temperature and its Pressure on Small Bodies.*

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PART I.

TEMPERATURE.

WHEN a surface is a full radiator and absorber* its temperature can be determined at once by the fourth-power law if we know the rate at which it is radiating energy. If it is radiating what it receives from the sun, then a knowledge of the solar constant enables us to find the temperature. We can thus make estimates of the highest temperature which a surface can reach when it is only receiving heat from the sun. We can also make more or less approximate estimates of the temperatures of the planetary surfaces by assuming conditions under which the radiation takes place,† and we can determine, fairly exactly, the temperatures of very small bodies in interplanetary space.

These determinations require a knowledge of the constant of radiation and of either the solar constant or the effective temperature of the sun, either of which, as is well known, can be found from the other by means of the radiation constant. It will be convenient to give here the values of these quantities before proceeding to apply them to our special problems.

* A surface which absorbs, and therefore emits, every kind of radiation, is usually described as "black," a description which is obviously bad when the surface is luminous. It is much better described as "a full absorber" or "a full radiator."

† This was pointed out by W. WIEN in his report on "Les Lois Théoriques du Rayonnement" ('Congrès International de Physique,' vol. ii., p. 30). He remarks that STEFAN'S law enables us to calculate the temperatures of celestial bodies which receive their light from the sun, by equating the energy which they radiate to the energy which they receive from the sun, and states that for the earth we obtain nearly the mean temperature, using the reflecting power of Mars, while the temperature of Neptune should be below $-200°$ C.

The Constant of Radiation.

If R is the energy radiated per second per square centimetre by a full radiator at temperature θ° A (where A stands for the absolute scale), the fourth-power law states that

$$R = \sigma\theta^4,$$

where σ is the constant of radiation.

According to KURLBAUM* the constant is

$$\sigma = 5{\cdot}32 \times 10^{-5} \text{ erg.}$$

The Solar Constant.

The solar constant is usually expressed as a number of calories received per minute by a square centimetre held normal to the sun's rays at the distance of the earth. The determinations by different observers differ so widely that it is not necessary for our present purpose to consider whether the constant really exists or whether there are small periodic variations from constancy.

ÅNGSTRÖM estimated the value as 4 calories per square centimetre per minute, and this value is adopted by CROVA as very probable.† When converted to ergs per second this gives

$$S_a = 0{\cdot}28 \times 10^7 \text{ ergs/cm.}^2 \text{ sec.},$$

where the suffix denotes that it is ÅNGSTRÖM'S value.

LANGLEY‡ assumed that the atmosphere transmits about 59 per cent. of the energy from a zenith sun and from his measurement of the heat reaching the earth's surface he estimated the value of the constant at 3 calories. This gives

$$S_l = 0{\cdot}21 \times 10^7 \text{ ergs/cm.}^2 \text{ sec.},$$

ROSETTI§ assumed a transmission of 78 per cent. from the zenith sun, but WILSON and GRAY‖ consider that 71 per cent. represents ROSETTI'S numbers better than 78 per cent. If in LANGLEY'S value we replace 59 per cent. by 71 per cent. we get 2·5 calories. This gives

$$S_r = 0{\cdot}175 \times 10^7 \text{ ergs/cm.}^2 \text{ sec.}$$

* 'Wied. Ann.,' vol. 65, 1898, p. 748.

† 'Congrès International de Physique,' vol. 3, p. 453.

‡ 'Phil. Mag.,' vol. 15, 1883, p. 153, and 'Researches on Solar Heat.'

§ 'Phil. Mag.,' vol. 8, 1879, p. 547.

‖ 'Phil. Trans.,' A, 1894, p. 383.

The Radiation from the Sun's Surface.

If s is the radius of the sun's surface, R the radiation per square centimetre, then the total rate of emission is $4\pi s^2 R$. This passing through the sphere of radius r, at the distance of the earth and with surface $4\pi r^2$, gives

$$4\pi s^2 R = 4\pi r^2 S,$$

where S is the solar constant.

Hence

$$R = \frac{r^2}{s^2} S = \left(\frac{9{\cdot}23 \times 10^7}{4{\cdot}3 \times 10^5}\right)^2 S = 46{,}000S.$$

Corresponding to the three values of S just given we have three values of R, viz.,

$$R_a = 1{\cdot}29 \times 10^{11}; \qquad R_l = 0{\cdot}945 \times 10^{11}; \qquad R_r = 0{\cdot}805 \times 10^{11}.$$

The Effective Temperature of the Sun.

If we equate the sun's radiation to $\sigma\theta^4$, where σ is the radiation constant, we get θ, the "effective temperature" of the sun, that is the temperature of a full radiator which is emitting energy at the same rate.

Thus

$$5{\cdot}32 \times 10^{-5}\,\theta_a^4 = 1{\cdot}29 \times 10^{11},$$

whence

$$\theta_a = 7000^\circ \text{ A approximately.}$$

Similarly

$$\theta_l = 6500^\circ \text{ A}; \qquad \theta_r = 6200^\circ \text{ A}.$$

WILSON* made a direct comparison of the radiation from the sun with that from a full radiator at known temperature. Assuming a zenith transmission of 71 per cent., he obtained 5773° A as the effective solar temperature. If we put

$$46{,}000S = 5{\cdot}32 \times 10^{-5} \times 5773^4,$$

we get

$$S = 0{\cdot}128 \times 10^7.$$

This is no doubt too low a value. Either then WILSON's zenith transmission was less than 71 per cent. or KURLBAUM's constant is too small.

The low value is probably to be accounted for chiefly by the first supposition. WILSON points out that if x is the true value of the transmission, his value of the temperature is to be multiplied by $(71/x)^{\frac{1}{4}}$. If we take $\theta_r = 6200^\circ$ as the true value then x will be given by

$$x = \left(\tfrac{5}{6}\tfrac{7}{2}\tfrac{7}{0}\tfrac{3}{0}\right)^4 \times 71 = 53.$$

This low value is not necessarily inconsistent with the much higher value 71 per cent.

* 'Roy. Soc. Proc.,' vol. 69, 1901–2, p. 312.

used above in finding ROSETTI's solar constant, for no doubt the transmission varies widely with time and place, and we have no reason to assume that 1·77 calories per minute, obtained by LANGLEY, would have been received from the zenith at the time and in the place where WILSON was making his determination.

The Effective Temperature of Space.

In determining the steady temperature of any body as conditioned by the radiation received from the sun, we have to consider whether it is necessary to take into account the radiation from the rest of the sky. If it receives S from the sun, ρ from the rest of the sky, and if its own radiation is R, then in the steady state

$$R = S + \rho \quad \text{or} \quad R - \rho = S.$$

It behaves therefore as if it were receiving S from the sun, but as if it were placed in a fully radiating enclosure of such temperature that the radiation is ρ. This temperature is the "effective temperature of space."

The temperature may perhaps be more definitely described as that of a small full absorber placed at a distance from any planet and screened from the sun. Various well-known attempts have been made to estimate this temperature, but the data are very uncertain. The fourth-power law however shows that it is not very much above the absolute zero, if we can assume that the quality of starlight is not very different from that of sunlight.

According to L'HERMITE * starlight is one-tenth full moonlight. Full moonlight is variously estimated in terms of full sunlight. LANGLEY † takes it as $\frac{1}{400,000}$. These two values combined give sunlight as 4×10^6 starlight. But starlight comes from the whole hemisphere, while the sun only occupies a small part of it. In comparing temperatures we have to use the brightness of sunlight as if the whole hemisphere were paved with suns.

If B is the illumination of a surface at O, fig. 1, lighted by the sun in the zenith at S, and if πs^2 is the area of the sun's diametral plane, then $B/\pi s^2$ is the illumination at O due to each square centimetre. If the hemisphere were all of the same brightness as the sun, the illumination at O due to the ring of sky between θ and $\theta + d\theta$ would be

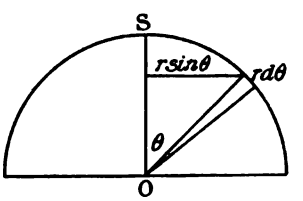

Fig. 1.

$$\frac{B}{\pi s^2} 2\pi r^2 \sin\theta \cos\theta \, d\theta,$$

where r is the distance of the sun.

* 'L'Astronomie,' vol. 5, p. 406.

† "First Memoir on the Temperature of the Surface of the Moon." 'National Academy of Sciences,' vol. 3.

Integrating from $\theta = 0$ to $\theta = \pi/2$, we have

$$\text{Total illumination} = Br^2/s^2 = 46{,}000 \text{ B.}$$

The illumination from a hemisphere paved with suns is therefore $46{,}000 \times 4 \times 10^6 = 1{\cdot}84 \times 10^{11}$ times that from the stellar sky.

If we assume that the quality of the radiation is the same in both cases, that is, if we assume that the energy is proportional to the light part of the spectrum, we have by the fourth-power law

$$\text{Effective temperature of space} = \frac{\text{effective temperature of sun}}{(\cdot 184 \times 10^{12})^{\frac{1}{4}}}$$

$$= \frac{\text{effective temperature of sun}}{655}.$$

As the temperature of the sun probably lies between 6000° A and 7000° A, this gives

$$\text{Effective temperature of space} = 10° \text{ A.}$$

If, then, a body is raised by the sun to even such a small multiple of 10^c as, say, 60°, the fourth-power law of radiation implies that it is giving out and therefore receiving from the sun more than a thousand times as much energy as it is receiving from the sky.

The sky radiation may therefore be left out of the account when we are dealing with approximate estimates and not with exact results, and bodies in the solar system may be regarded as being situated in a zero enclosure except in so far as they receive radiation from the sun.

Temperature of a Planet under Certain Assumed Conditions when placed at a distance from the Sun equal to that of the Earth.

The real earth presents a problem of complexity far too great to deal with. I shall therefore consider an ideal earth for which certain conditions hold, more or less approximating to reality, and determine the temperature of its surface on the assumption that it receives heat from the sun only.

Let us suppose :—

1. That the planet is rotating about an axis perpendicular to the plane of its orbit, which is circular.

This will give us too high a temperature at the equator, and the absolute zero, which is too low, at the poles. The mean, however, over the planet, will probably be not much affected by the supposition.

2. That the effect of the atmosphere is to keep the temperature in any given latitude the same, day and night.

This is not a great departure from reality. On the sea, which is more than two-

thirds of the earth's surface, the daily range is very small, of the order of 1° or 2° C., while even on the land it is, in extreme cases, not more than 15° C., which is not a large fraction of the absolute temperature.

3. That the surface and the atmosphere over it at any one point have one effective temperature as a full radiator. This is no doubt a departure from reality. How wide a departure we have no present means of estimating.

4. That there is no convection of heat from one latitude to another.

This is a very wide departure from reality. But, as we shall see below, the mean temperature of the planet is very little affected by convection, even if we assume that it is so extensive as to make the surface of uniform temperature.

5. That the reflexion at each point is $\frac{1}{10}$th of the radiation received.

This is probably of the order of the actual reflexion from the earth. According to LANGLEY* the moon reflects about $\frac{1}{8}$th of the radiation received. The earth certainly reflects less. The temperatures determined hereafter are proportional to the 4th root of the coefficient of absorption. Even if this coefficient is as low as 0·9 its 4th root is 0·974. Hence if the actual value is anywhere between 0·9 and 1, the assumed value of 0·9 will not make an error of more than $2\frac{1}{2}$ per cent. in the value of the temperature.

6. That the planet ultimately radiates out all the heat received from the sun, no more and no less.

This again is very near the condition of the real earth, which, on the whole, radiates out rather more than it receives—perhaps on the average a calorie per square centimetre in three days.

Making these six suppositions, let us calculate the temperature of various parts of this ideal planet.

Consider a band between latitudes λ and $\lambda + d\lambda$. The area receiving heat from the sun at any instant, if projected normally to the stream of solar radiation, is (fig. 2)

$$2r \cos\lambda \, r d\lambda \cos\lambda = 2r^2 \cos^2\lambda d\lambda,$$

where r is the radius of the planet.

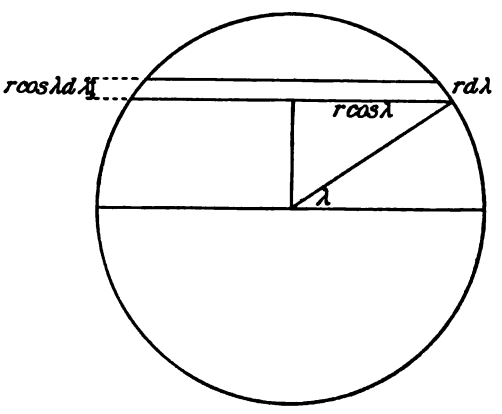

Fig. 2.

If S is the solar constant, this band is absorbing, with coefficient 0·9,

$$0{\cdot}9S \times 2r^2 \cos^2\lambda d\lambda.$$

But the band all round the globe is radiating equally, according to the second supposition, and the radiating area is

$$2\pi r \cos\lambda \, . \, r d\lambda = 2\pi r^2 \cos\lambda d\lambda.$$

* "Third Memoir on the Temperature of the Moon." 'National Academy of Sciences,' vol. 4, Part 2, p. 197.

Hence the radiation emitted per square centimetre is

$$\frac{0{\cdot}9\ \mathrm{S}\ 2r^2 \cos^2\lambda\, d\lambda}{2\pi r^2 \cos\lambda\, d\lambda} = \frac{0{\cdot}9\ \mathrm{S}\cos\lambda}{\pi}.$$

If the effective temperature in this latitude is θ_λ, we have

$$\frac{0{\cdot}9\ \mathrm{S}\cos\lambda}{\pi} = 5{\cdot}32 \times 10^{-5}\theta_\lambda^4,$$

or

$$\theta_\lambda = \left(\frac{0{\cdot}9 \times 10^5 \mathrm{S}}{5{\cdot}32\pi}\right)^{\frac{1}{4}} \cos^{\frac{1}{4}}\lambda.$$

If we put $\lambda = 0$, we get the equatorial temperature corresponding to each of the different values of S given above, viz. :

Equatorial $\theta_a = 350°$ A approximately.
,, $\theta_l = 325°$ A ,,
,, $\theta_r = 312°$ A ,,

The temperature in latitude λ is

$$\theta_\lambda = \text{equatorial temperature} \times \cos^{\frac{1}{4}}\lambda.$$

Thus, in latitude 45°, it is 0·917 equatorial temperature.

The average temperature over the globe is

$$\frac{2}{4\pi r^2}\int_0^{\frac{\pi}{2}} 2\pi r^2 \cos\lambda\,\theta_\mathrm{E}\cos^{\frac{1}{4}}\lambda\, d\lambda,$$

where θ_E is the equatorial temperature

$$= \theta_\mathrm{E}\int_0^{\frac{\pi}{2}} \cos^{\frac{1}{4}}\lambda\, d\lambda = \theta_\mathrm{E}\frac{\sqrt{\pi}}{2}\frac{\Gamma\left(\frac{9}{8}\right)}{\Gamma\left(\frac{5}{8}\right)} = 0{\cdot}93\theta_\mathrm{E}.$$

The average temperature, then, is little more than 1 per cent. above the temperature in latitude 45°.

If we use the three values of θ_E just given, we have

Average $\theta_a = 325°$ A approximately.
,, $\theta_l = 302°$ A ,,
,, $\theta_r = 290°$ A ,,

Our fourth supposition was that there is no convection by wind or water from one latitude to another. Let us now go to the other extreme and suppose that the convection is so great that the temperature is practically uniform all over the globe.

We then have a receiving surface virtually πr^2, and a radiating surface $4\pi r'^2$. Then we get the radiation emitted per square centimetre

$$\frac{0{\cdot}9S\pi r^2}{4\pi r'^2} = \frac{9S}{40};$$

and if θ is the temperature required for this,

$$5{\cdot}32 \times 10^{-5}\theta^4 = \frac{9S}{40};$$

whence

Uniform $\theta_a = 330°$ A approximately
„ $\theta_l = 307°$ A „
„ $\theta_r = 293°$ A „

values not more than 5° above those obtained for the average on the supposition of no convection.

Comparing these results with the temperature of the real earth, it is seen at once that they are of the same order.

The average temperature of the earth's surface is usually estimated at about 60° F., say 289° A. The temperature of the atmosphere is on the whole decidedly lower than that of the surface below it. We should therefore conclude that the earth's effective temperature is somewhat below 289° A.

Again, the earth and the atmosphere, taken as one surface, do not constitute a full absorber, but are to some extent selective. Hence we should expect the earth to be, if anything, of a higher temperature than a full absorber and radiator under the same conditions.

For both these reasons, then, the ideal planet might be expected to have a temperature below rather than above 289° A. The lowest estimate obtained above is therefore probably nearest to the truth, and it would appear that even that is somewhat too high. This tends to show that, if we accept KURLBAUM'S value of the radiation constant, we cannot put the solar constant so high as 3 or 4, but must accept a value much nearer to that which I have called ROSETTI'S value, viz., 2·5.

In what follows I shall therefore take ROSETTI'S value and the resulting value of the solar temperature, viz., 6200° A.

The calculation made above may be turned the other way round, and may be used for a

Determination of the Effective Temperature of the Sun from the Average Temperature of the Earth.

Assuming that the real earth may be replaced by the ideal planet already considered, the radiation per square centimetre from the equatorial band is $\frac{0{\cdot}9S}{\pi}$. But the

radiation per square centimetre from the sun's surface is 46,000S. If then θ_E is the earth's equatorial temperature, and θ_S is the solar temperature,

$$\frac{0{\cdot}9S}{\pi} : 46{,}000S = \theta_E^4 : \theta_S^4,$$

whence

$$\theta_E = \theta_S/20.$$

The average temperature of the earth is 0·93 of the equatorial temperature. If this average is θ_A, then

$$\theta_A = \theta_S/21{\cdot}5.$$

If we take the temperature of the real earth as 289° A, and as being equal to that of the ideal,

$$\theta_S = 21{\cdot}5 \times 289° = 6200° \text{ A approximately.}$$

Upper Limit to the Temperature of a Fully Radiating Surface exposed normally to Solar Radiation at the Distance of the Earth from the Sun.

The highest temperature which a full radiator can attain is that for which its radiation is equal to the energy received. This will only hold when no appreciable quantity of heat is conducted inwards from the surface.

To obtain the upper limit in the case under consideration, we have to equate the radiation to the solar constant, which we shall now take as $S_r = 0{\cdot}175 \times 10^7$. Then,

$$5{\cdot}32 \times 10^{-5}\theta^4 = 0{\cdot}175 \times 10^7,$$

and

$$\theta = 426° \text{ A.}$$

If the surface reflects some of the radiation and absorbs a fraction x of that falling on it, then the effective temperature is

$$x^{\frac{1}{4}} \times 426° \text{ A.}$$

The Limiting Temperature of the Surface of the Moon.

We may apply this result to find an upper limit to the temperature of the moon's surface. This upper limit can only be attained when it is sending out radiation as rapidly as it receives it, and is therefore conducting no appreciable quantity inwards.

We shall take LANGLEY'S estimate (*loc. cit.*) of $\frac{\text{reflected radiation}}{\text{emitted radiation}} = \frac{1}{6{\cdot}7}$. This is represented nearly enough by $x = \frac{7}{8}$.

The upper limit of temperature of the surface exposed to a zenith sun is, therefore,

$$\theta = 426 \times (\tfrac{7}{8})^{\frac{1}{4}} = 426 \times 0{\cdot}967 = 412° \text{ A.}$$

This, then, is the upper limit to the temperature of the hottest part of an airless moon.

For a surface at angle λ with the line to the sun,

$$\theta_\lambda = 412 \cos^{\frac{1}{4}} \lambda.$$

If we take this as the law of temperature of the side of the moon exposed to the sun, we can find the effective temperature of the full moon as seen from the earth, *i.e.*, the uniform temperature of a flat disc of radius equal to that of the moon, sending to us the same total radiation.

If $N d\omega$ is the normal stream of radiation from 1 sq. centim. of surface of the moon immediately under the sun sent out through a cone angle $d\omega$, that sent out in direction λ to the normal is $N \cos \lambda \, d\omega$. But 1 sq. centim. on the moon's surface inclined at λ to the sun's rays only receives $\cos \lambda$ of the radiation received by the surface immediately under the sun. It therefore sends in the direction of the earth, also at λ to the normal, only $N \cos^2 \lambda \, d\omega$. Hence the total radiation to the earth, obtained by putting $d\omega = 2\pi \sin \theta \, d\theta$ and integrating is

$$\int_0^{\frac{\pi}{2}} \frac{N \cos^2 \lambda \, 2\pi m^2 \sin \lambda \, d\lambda}{r^2},$$

where m is the radius of the moon and r is its distance from the earth

$$= \frac{2\pi}{3} \frac{m^2}{r^2} N.$$

Let N_D be the normal stream from the equivalent flat disc, then

$$\frac{\pi m^2 N_D}{r^2} = \tfrac{2}{3}\pi \frac{m^2}{r^2} N$$

and

$$N_D = \tfrac{2}{3} N.$$

The effective temperature of the flat disc is therefore $\sqrt[4]{\frac{2}{3}}$ that of the surface immediately under the sun at the same distance from it.

Then the effective average $= 412 \times \sqrt[4]{\frac{2}{3}} = 412 \times 0{\cdot}9 = 371°$ A. The upper limit, then, to the average effective temperature of the moon's disc is just below that of boiling water.

This is very considerably above LANGLEY'S estimate, that the surface of the full moon is a few degrees above the freezing-point. There can be no doubt that a very appreciable amount of heat is conducted inwards. The observations during eclipses by LANGLEY* and by BOEDDICKER show that some heat is still received from the moon's surface when it has entered the full shadow, and that it takes time after the eclipse has passed to establish a steady temperature again. It might be possible to

* "Third Memoir," p. 159.

make some rough estimate of the amount conducted inwards from the Fourier equation, but the problem is not an easy one. Perhaps we get the best estimate by comparing the actual temperature with that above found.

If the actual temperature is taken as about $\frac{4}{5}$ the upper limit, say 297° A, then the radiation outwards is of the order $\sqrt[4]{\frac{4}{5}} = 0{\cdot}41$ of that where no conduction exists. Then nearly $\frac{3}{5}$ of the heat is probably conducted inwards.

If the moon always turned the same face to the sun instead of to the earth, the upper limit would be approached.

Temperature of a Spherical Absorbing Solid Body of the Order 1 *centim. in diameter at the Distance of the Earth from the Sun.*

The calculation of the temperature of such a body is interesting for two reasons. Firstly, the body will be at nearly the same temperature throughout, and secondly, as we shall show in the second part of this paper, the mutual repulsion of two such bodies, due to the pressure of their radiation, is of the same order as their gravitative attraction.

If the radius of the body is a, its effective receiving area is πa^2, and it receives

$$\pi a^2 \mathrm{S} \text{ ergs/sec.}$$

Its radiating surface is $4\pi a^2$, and therefore its average radiation per square centimetre in the steady state is

$$\pi a^2 \mathrm{S}/4\pi a^2 = \tfrac{1}{4}\mathrm{S}.$$

If we take $\mathrm{S} = 2{\cdot}5$ cal./min. or $0{\cdot}04$ cal./sec., and if the conductivity is of the order of that of terrestrial rock lying, say, between $0{\cdot}01$ and $0{\cdot}001$, it is evident that a difference of temperature of only a few degrees between the receiving and the dark surfaces will convey heat sufficient to supply radiation, $0{\cdot}01$ cal./sec., equal to the average. Thus, if the conductivity is $0{\cdot}001$ and the diameter is 1 centim., a difference of temperature of 10° suffices.

We may therefore take the temperature of the surface as approximately uniform when the steady state is reached. Let the temperature be θ, and let the solar temperature be θ_s. Then we have

$$\theta^4 : \theta_s^4 = \frac{\mathrm{S}}{4} : 46{,}000\,\mathrm{S}$$

and

$$\theta = \frac{\theta_s}{20{\cdot}7}.$$

If

$$\theta_s = 6200° \text{ A},$$

$$\theta = 300° \text{ A approximately.}$$

This will be the temperature of fully absorbing bodies smaller than 1 centim., so long as they are not too small to absorb the radiation falling on them.

Variation of Temperature with Distance from the Sun.

Since the radiation received varies inversely as the square of the distance from the sun, that given out varies in the same ratio. The temperature of the radiating surface varies therefore as the fourth root of the inverse square, that is inversely as the square root of the distance.

This enables us to deduce at once the temperatures of the various surfaces and bodies which we have considered, if placed at the distances of different planets as well as at the distance of the earth. We have merely to multiply the results hitherto found by $\sqrt{\frac{\text{Earth's distance}}{\text{Planet's distance}}}$.

The following table contains the values of the temperatures at selected distances, all on the absolute scale :—

TABLE of Temperatures of Surfaces at Different Distances from the Sun. All on the Absolute Scale.

At the distance of the planet.	Distance. Earth's distance = 1.	Square root of (distance)$^{-1}$.	Equatorial temperature of ideal planet.	Average temperature of ideal planet.	Upper limit of a surface reflecting one-eighth under zenith sun.	Average temperature of equivalent disc.	Temperature four-fifths that of equivalent disc.	Temperature of small absorbing sphere.
I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.
Mercury .	0·3871	1·61	502	467	664	598	478	483
Venus . .	0·7233	1·18	368	342	486	438	350	358
Earth . .	1·0000	1·00	312	290	412	371	297	300
Mars . .	1·5237	0·81	253	235	337	300	240	243
Neptune .	30·0544	0·18	56	52	74	67	53	54

We have omitted the larger planets except Neptune, since in all probability they radiate heat of their own in considerable proportion. Neptune is inserted merely to show how low temperatures would be at his distance if there were no supply of internal heat.

The results given in the table may not be exactly applicable to any of the planets, but they at least indicate the order of temperature which probably prevails.

If, for instance, Mars is to be regarded as having an atmosphere with regulating properties like our own, his equatorial temperature, Column IV., is probably far below the temperature of freezing water, and his average temperature, Column V., must be not very different from that of freezing mercury. If, on the other hand, we suppose that his atmosphere has no regulating power, we get the upper limits not very

different from those in Columns VI. and VII. These are the limits for the bright side, and they imply nearly absolute zero on the dark side. If we regard Mars as resembling our moon, and take the moon's effective average temperature as 297° A, the corresponding temperature for Mars is 240° A, and the highest temperature is $\frac{4}{5} \times 337 = 270°$. But the surface of Mars has probably a higher coefficient of absorption than the surface of the moon—it certainly has for light—so that we may put his effective average temperature on this supposition some few degrees above 240° A, and his equatorial temperature some degrees higher still.

It appears exceedingly probable, then, that whether we regard Mars as like the earth, or, going to the other extreme, as like the moon, the temperature of his surface is everywhere below the freezing-point of water. The only escape from this conclusion that I can see is by way of a supposition that an appreciable amount of heat is issuing from beneath his surface.

We cannot draw any definite conclusions as to the temperatures of Mercury and Venus till we know whether they have atmospheres and whether they rotate on their own axes. If we make both these suppositions and further suppose that their conditions approximate to those of the ideal planet at their distances given in Columns IV. and V., then they may well be surrounded by hot clouds, as is sometimes supposed, entirely screening their solid bodies from us. If, on the other hand, their atmospheres are ineffective as regulators and if they always present the same face to the sun, the hottest part of Mercury is probably not far from 650° A, and that of Venus not far from 500° A.

If a comet consist of small solid particles of diameter of the order 1 centim. or less, then the temperatures of these particles are given in Column IX. At one-quarter of the earth's distance, say 23 million miles from the sun, the temperature is 600°, about the melting-point of lead. At one-twenty-fifth, say $3\frac{3}{4}$ million miles, it will be about 1500°, say the melting point of cast-iron. Nearer than this the temperature no doubt increases rapidly, but the law of temperature, deduced from the inverse square law for the radiation received, requires amendment, as that law was based on the supposition that a hemisphere only is lighted by the sun, and that the whole of his disc is visible from every part of that hemisphere. Both of these suppositions cease to hold when the distance from the sun is only a small multiple of his radius.

PART II.

Radiation Pressures.

The pressure of radiation against a surface on which it falls, first deduced by Maxwell from the Electromagnetic Theory of Light, is now established on an experimental basis by the work of Lebedew, confirmed by that of Nichols and Hull.

Though this pressure was first deduced as a consequence of the Electromagnetic Theory, BARTOLI showed, independently, that a pressure must exist without any theory as to the nature of light beyond a supposition which may perhaps be put in the form that a surface can move through the ether, doing work on the radiation alone and not on the ether in which the radiation exists. Professor LARMOR* has given a proof of this pressure and has shown that it has the value assigned to it by MAXWELL, viz., that it is numerically equal to the energy density in the incident wave, whatever may be the nature of the waves, so long as their energy density for given amplitude is inversely as the square of the wave-length. We may, in fact, regard a pencil of radiation as a stream of momentum, the direction of the momentum being the axis of the pencil. If E is the energy density of the pencil, U its velocity, the momentum density may be regarded as E/U.

If the stream of radiation is being emitted by a surface, the surface is losing the momentum carried out with the issuing stream, and is so being pressed backwards. If the stream is being absorbed by the surface, then it is gaining the momentum and is still being pressed backwards, the forces being in the line of propagation.

As the expressions for the radiation pressure in various cases are probably not very well known, it may be convenient to state them here for use in what follows.

Values of Radiation Pressure in Different Cases.

If 1 sq. centim. of a full radiator is emitting energy R per second, and if $N d\omega$ is the energy it is emitting through a cone $d\omega$, with axis along the normal, then in direction θ its projection is $\cos\theta$, and it is emitting $N \cos\theta d\omega$ through a cone $d\omega$. Putting $d\omega = 2\pi \sin\theta d\theta$, and integrating over the hemisphere, we have

$$R = \int_0^{\frac{\pi}{2}} N \cos\theta \,.\, 2\pi \sin\theta \, d\theta = \pi N.$$

If we draw a hemisphere, radius r, round the source as centre, the energy falling on area $r^2 d\omega$ is $N \cos\theta d\omega$ per second, and, since the velocity is U per second, the energy density just outside the surface on which it falls is $N \cos\theta/Ur^2$, and this is the rate at which the momentum is being received, that is, it is the normal pressure. The total force on area $r^2 d\omega$ is $N \cos\theta d\omega/U$. This is the momentum sent out by the radiating square centimetre per second through the pencil with angle $d\omega$, in the direction θ, and is therefore the force on the square centimetre due to that pencil.

Resolving along the normal and in the surface we have

$$\text{Normal pressure} = N \cos^2\theta \, d\omega/U.$$

$$\text{Tangential stress} = N \cos\theta \sin\theta \, d\omega/U.$$

* 'Brit. Assoc. Report,' 1900; 'Encyc. Brit.,' vol. 32, Art. "Radiation."

Putting $d\omega = 2\pi \sin\theta\, d\theta$ and integrating over the hemisphere, we get

$$\text{Total normal pressure} = \int_0^{\frac{\pi}{2}} (\mathrm{N}\cos^2\theta \,.\, 2\pi \sin\theta d\theta/\mathrm{U}) = 2\pi\mathrm{N}/3\mathrm{U} = 2\mathrm{R}/3\mathrm{U}.$$

Total tangential stress = 0, since the radiation is symmetrical about the normal.

If the surface is receiving radiation, let us suppose that the stream is a parallel pencil S per second per square centimetre held normal to the stream, and that it is inclined at θ to the normal to the receiving surface. The momentum received per second is S cos θ/U. This produces

$$\text{Normal pressure} = \mathrm{S}\cos^2\theta/\mathrm{U}.$$
$$\text{Tangential stress} = \mathrm{S}\cos\theta\sin\theta/\mathrm{U}.$$

If the stream is entirely absorbed both these forces exist.

If the stream is entirely reflected, the reflected pencil exerts an equal normal force and an equal and opposite tangential force, and we have only normal pressure of amount $2\mathrm{S}\cos^2\theta/\mathrm{U}$.

If only a fraction μ is reflected, the incident and reflected streams will give

$$\text{Normal pressure} = (1+\mu)\,\mathrm{S}\cos^2\theta/\mathrm{U}.$$
$$\text{Tangential stress} = (1-\mu)\,\mathrm{S}\cos\theta\sin\theta/\mathrm{U}.$$

To the normal pressure must be added the pressure due to the radiation emitted from the surface.

Radiation Pressure in Full Sunlight.

If a full absorber is exposed normally to the solar radiation at the distance of the earth the pressure on it is S/U, or $\dfrac{0{\cdot}175 \times 10^7}{3 \times 10^{10}} = 5{\cdot}8 \times 10^{-5}$ dyne/sq. centim.

The Radiation Pressures Between Small Bodies. Comparison with their mutual Gravitation.

It is well known that the radiation force on a small body, exposed to solar radiation, does not decrease so rapidly as gravitative pull on the body as its size decreases. If the body is a sphere of radius a and density ρ, and with a fully absorbing surface, and if it is so small that it is practically at one temperature all through, it is receiving a stream of momentum

$$\pi a^2\mathrm{S}/\mathrm{U}$$

directed from the sun. Its own radiation outwards being equal in all directions has zero resultant pressure.

The gravitative acceleration towards the sun at the distance of the earth is about 0·59 centim./sec.^{2}. Then we have

$$\frac{\text{Radiation pressure}}{\text{Gravitation pull}} = \frac{\pi a^2 S}{U \times \frac{4}{3}\pi a^3 \rho \times 0{\cdot}59}.$$

The two will be equal when

$$a = \tfrac{3}{4} \frac{S}{U\rho \times 0{\cdot}59}.$$

If we put

$$\rho = 1\,;\ S = 0{\cdot}175 \times 10^7\,;\ U = 3 \times 10^{10}\,;$$

we get

$$a = 74 \times 10^{-6}.$$

This is the well-known result that a body of diameter about two wave-lengths of red light would be equally attracted and repelled if we could assume that a surface so small still continued to absorb. But, of course, when we are getting to dimensions comparable with a wave-length that assumption can no longer be made.

It is not, I think, equally well recognised that if the radiating body is diminished in size, the radiation pressure due to it also decreases less rapidly than the gravitative pull which it exerts. For the radiation decreases as the square of the radius of the emitting body and its gravitative pull as the cube.

We can easily compare the radiation and gravitation forces between two bodies, if for simplicity we assume that their distance apart is very great compared with the radius of either.

Let AB, fig. 3, be two spheres with full radiating surfaces. Let their radii be

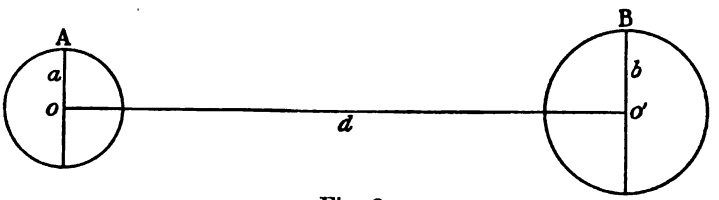

Fig. 3.

a, b and let their centres oo' be d apart. If this distance is great compared with a and b, each may be regarded as receiving a parallel stream from the other.

Let A send out a normal stream $N\,d\omega$ per square centimetre through cone $d\omega$, while B sends out $N'\,d\omega$.

B receives the stream of cross section πb^2 or the angle of the cone is $\pi b^2/d^2$, and it issues virtually from area πa^2, for at B, A will appear as a uniformly bright flat disc.

Then the total force on B is

$$\frac{\pi a^2 N}{U} \times \frac{\pi b^2}{d^2} = \frac{\pi a^2 b^2 R}{U d^2},$$

where

$$R = \pi N.$$

The force on A due to B is $\pi a^2b^2R'/Ud^2$, where $R' = \pi N'$.

These are not equal unless $R = R'$, *i.e.*, unless the two bodies have the same temperature, an illustration of the fact that equality of action and reaction does not hold between the radiating and receiving bodies alone. They no longer constitute the whole of the momentum system. The ether, or whatever we term the light-bearing medium, is material, and takes its part in the momentum relations of the system.

If the surfaces are partially or totally reflecting, the forces are easily obtained. Thus if one is totally reflecting, it can be shown that the force is only half as great as when it is fully absorbing. But it will be sufficient to confine ourselves to the case of complete absorption, followed by radiation of the absorbed heat equally in all directions from all parts of the surface. More general assumptions do not alter the order of the forces found.

If G is the constant of gravitation $= 6{\cdot}67 \times 10^{-8}$, and if ρ, ρ' are the densities of A and B, the gravitation pull is $G\,\frac{16\pi^2a^3b^3\rho\rho'}{9\,d^2}$.

Then on B

$$\frac{\text{Radiation push F}}{\text{Gravitation pull P}} = \frac{9\pi a^2b^2R}{16GU\pi^2a^3b^3\rho\rho'},$$

or

$$\frac{F}{P} = \frac{9R}{16GU\pi ab\rho\rho'}.$$

If $a = b$; $\rho = \rho'$; $R = 5{\cdot}32 \times 10^{-5}\theta^4$, we have

$$a = \frac{2{\cdot}18\theta^2 \times 10^{-4}}{\rho}\sqrt{\frac{P}{F}}.$$

If we suppose the two bodies to have the temperature of the sun say, 6200° A, and its density, say 0·25, then F = P, when

$$a^2 = \frac{4{\cdot}75 \times 6200^4 \times 10^{-8}}{0{\cdot}25^2},$$

then $a = 33{,}500$ centims. or 335 metres.

Of course two globes of this size would soon cool far below the temperature of the sun, even if for an instant they could be raised up to it.

If we suppose $\theta = 300°$ A—the approximate temperature of small bodies at the distance of the earth from the sun—and if we take $\rho = 1$, then F = P, when $a = 19{\cdot}62$ centims.

Thus two globes of water—probably nearly full absorbers at 300° A—will at that temperature neither attract nor repel each other if their radii are about 20 centims.

If the density of the spheres is 11, about that so often used for masses in the Cavendish experiment, F = P when

$$a = 1{\cdot}78 \text{ centims.}$$

This does not throw any doubt on the results of Cavendish experiments, for it only holds when the radiators are in an enclosure of very low absolute temperature. In all Cavendish experiments the greatest care is taken to make the attracted body and its enclosure of one uniform temperature.

The really interesting case is that of two small meteorites, in interplanetary space. To judge from the specimens which succeed in penetrating the earth's atmosphere they are very dense. Let us suppose them to have density 5·5—that of the earth—and temperature 300° A, that which they will have at the earth's distance. Then F = P when

$$a = 3{\cdot}4 \text{ centims.}$$

If the radii of the bodies are less than the values found for equality of F and P in the different cases, the net effect is repulsion.

The ratio of F to P is inversely as the square of the radius, so that, as the radii are decreased from the values giving F = P, the radiation repulsion soon becomes enormously greater than the gravitation pull, and the latter may be neglected in comparison. Thus for two drops of water at 300° A in a zero enclosure, with radii 0·001 centim., the pressure is nearly 400,000,000 times the pull.

It is not, however, that the radiation force is great, or even its acceleration. The force becomes exceedingly minute, but the gravitation much more minute.

Thus consider two drops of water at 300° placed in a zero enclosure at a distance $d = 10a$ apart. Our assumption of parallel radiation from one to the other is now only a rough approximation, but the result will be of the right order.

The radiation push is $\pi a^4 R/Ud^2$, and the acceleration is $3aR/4Ud^2 = \frac{1}{10^7} \times \frac{1}{a}$ approximately.

This only becomes considerable when the drops approach molecular dimensions, and long before this they cease to absorb fully the stream of momentum falling on them. Still, even molecules are selective absorbers, and absorb especially each other's radiations. And we may expect that if two gas molecules collide and set each other radiating much more violently than before, they will be practically in an enclosure of much lower temperature than their own, and their mutual radiation may result in very rapid repulsion—repulsion of the order of the fourth power of the temperature reached.

Radiation Pressure between Small Bodies at Different Distances from the Sun.

We have seen above, that if two small spheres of density 5·5 are at the distance of the earth from the sun, their gravitation will be balanced by their radiation pressure when the radius of each is 3·4 centims. Now the balancing radius is proportional to the square of the temperature, that is, inversely proportional to the distance, since the temperature (Part I.) is inversely as the square root of the distance. Thus, at the distance of Mercury, the radii would be about 9 centims.; a million miles from the

sun's surface they would be about 200 centims.; out at Neptune they would be about 1 millim.

We see then that the mutual action between small bodies of density that of the earth, will, at different distances, change sign for different sizes of body, ranging from something of the order of 4 metres diameter near the sun to the order of 2 millims. diameter at the distance of Neptune. A ring of small planets, each of radius 3·4 centims., and density 5·5, would move round the sun at the distance of the earth without net mutual attraction or repulsion, and each might be regarded as moving independently of the rest. It appears possible that if Saturn is hot enough, considerations of this kind may apply to his rings.

The repulsion between small colliding bodies, even if not heated by the sun, must lead to some delay in their final aggregation. This is obvious when there are only two small bodies, and their temperature is very considerably raised by the collision. But there is also delay, if instead of a single pair we suppose two swarms to collide. Near the boundary of the colliding region, a body will experience radiation pressure chiefly on one side, and will tend to be driven out of the system. Of course, if the swarms are so dense that a member near the outside cannot see through the rest, this effect will be less. A body in front of another entirely screens its radiation, but the gravitation is not screened. Hence, a body near the boundary of a densely-packed region of collision may be repelled only by the colliding bodies just round it, while it will be attracted by all; or, to put the same idea in another way, a body in a spherical swarm of uniform temperature will only be pulled equally in all directions at the centre of the swarm, but it will be equally repelled in all directions as soon as it is sufficiently deep to be surrounded by its fellows wherever, so to speak, it looks.

Inequality of Action and Reaction between Two Mutually Radiating Bodies.

We have seen that two distant spheres push each other with forces $\pi a^2b^2\mathrm{R}/\mathrm{U}\,d^2$ and $\pi a^2b^2\mathrm{R}'/\mathrm{U}\,d^2$, and that these, though opposite, are not equal unless $\mathrm{R} = \mathrm{R}'$.

It would be easy to imagine cases in which the forces were not even opposite or in the same directions. At first sight, then, it would appear that we have two bodies acting upon each other with unequal forces, but of course this statement is inexact. The bodies do not act upon each other at all; each sends out a stream of momentum into the medium surrounding it. Some of this momentum is ultimately intercepted by the other, and in its passage the momentum belongs neither to one body nor to the other. If we assume that the momentum is conserved, and of course everything in the methods of this paper depends on that assumption, the action on one of the bodies is equal and opposite to the reaction on the light-bearing medium contiguous to it. There is no failure of the law of action and reaction, but an extension of our idea of matter to include the medium. There should be no difficulty in this extension; indeed, we have made it long ago in endowing the medium with energy-

carrying properties. Whether the momentum in the medium is in the form of mass m moving with velocity v in the direction of propagation is perhaps open to doubt. We may, perhaps, have different forms of momentum just as we may have different forms of energy, and possibly we ought not to separate the momentum in radiation into the factors m and v, but keep it for the present as one quantity M.

An interesting example of inequality of the radiation forces on two mutually radiating bodies is afforded by two equal spheres, for which, at a given temperature, the radiation push F balances the gravitation pull P. Raise one in temperature so that the push on the other becomes F′. Lower the other so that the push on the first becomes F″, but adjust so that

$$F' + F'' = 2F = 2P,$$

then

$$P - F'' = F' - P.$$

There will then be equal accelerations of the two in the same, *not* in opposite directions, and a chase will begin in the line joining the centres, the hotter chasing the colder. If the two temperatures could be maintained, the velocity would go on increasing; but the increase would not be indefinitely great, inasmuch as a Doppler effect would come into play. Each sphere moving forward would crowd up against the radiation it emitted in front, and open out from the radiation it emitted backwards. This would increase the front and decrease the back pressure, and ultimately the excess of front pressure would balance the accelerating force due to mutual radiation.

Let us examine the effect of motion of a radiating surface on the pressure of its radiation against it.

Application of DOPPLER'S *Principle to the Radiation Pressure against a Moving Surface.*

If a unit area A, fig. 4, is moving with velocity u in any direction AB, making angle ψ with its normal AN, the effect on the energy density in the stream of radiation issuing in any direction AP is two-fold. If the motion is such as to shorten AP, the waves and their energy are crowded up into less space, and if such as to lengthen AP, they are opened out. At the same time, in the one case A is doing work against the radiation pressure and in the other is having work done on it. We shall assume, as in the thermodynamic theory of radiation, that this work adds to or subtracts from the energy of radiation. Both effects (1) the crowding, and (2) the work done, or the reverse of each, combine to alter the energy and therefore the radiation pressure. We have no data by which we can determine whether the

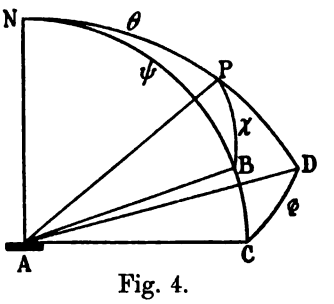

Fig. 4.

motion alters the rate at which the surface is emitting radiation, but it appears worth while to trace consequences on the assumption that the radiation goes on as if the surface were at rest,* but that it is crowded up into less space or spread over more, and that we can superpose on this the energy given out to, or taken from, the stream by the work done by or on the moving surface by the radiation pressure. This work can evidently be calculated to the first order of approximation by supposing the pressure equal to its value when the surface is at rest.

Let us draw from A as centre a sphere of radius U, equal to the velocity of radiation. The energy which, in a system at rest, would be radiated into a cone with A as vertex, length U, and solid angle $d\omega$, in the direction AP making χ with the direction of motion AB, will now be crowded up into a cone of length $U - u\cos\chi$, since $u\cos\chi$ is the velocity of A in the direction AP. We shall suppose that u/U is very small. Hence the energy density in the cone is increased in the ratio $U + u\cos\chi : U$ or by the factor $1 + u\cos\chi/U$.

Considering now the effect of the work done, the force on A due to the stream in $d\omega$ is $N\cos\theta\, d\omega/U$, and the work done in one second is $(N\cos\theta\, d\omega/U) \times u\cos\chi$.

When A is at rest the energy in this cone is

$$N\cos\theta\, d\omega.$$

When A is moving it is increased to

$$N\cos\theta\, d\omega + \frac{N\cos\theta\, d\omega}{U} u\cos\chi,$$

that is

$$N\cos\theta\, d\omega\left(1 + \frac{u\cos\chi}{U}\right).$$

Thus the effect of the work done is equal to that of the crowding and the energy density on the whole is increased in the ratio

$$1 + \frac{2u\cos\chi}{U} : 1.$$

The pressure is increased in the ratio of the energy density. Then the force on A due to the radiation through $d\omega$ is increased from

$$\frac{N\cos\theta\, d\omega}{U} \quad \text{to} \quad \frac{N\cos\theta\, d\omega}{U}\left(1 + \frac{2u\cos\chi}{U}\right).$$

* *Added August* 20, 1903.—Since the above was written Professor LARMOR has pointed out to me that the results obtained in the text from this assumption, along with the hypothesis of crowding of the radiation and its increase by an amount equivalent to the work of the radiation pressure, can be justified by an argument based on the following considerations. A perfect reflector moving with uniform speed in an enclosure, itself also moving at that speed, and so in a steady state, must send back as much radiation of every kind as a full radiator in its place. Now the electrodynamics of perfect reflexion are known; hence the effect of motion of a full radiator on the amount of its radiation can be determined. The result is equivalent to the statement that the amplitudes of the excursions of the optical vibrators are the same at the same temperature whether the source to which they belong is moving or not.

If we resolve this along the normal to the surface A and integrate over the hemisphere we obtain the total normal pressure. As we only want to know the change in pressure P we may neglect the first term which gives the pressure on A at rest, and we have

$$P = \int \frac{N \cos^2\theta}{U} \cdot \frac{2u \cos\chi}{U} \, d\omega.$$

If ϕ is the angle between the normal planes through B and P we have

$$\cos\chi = \cos\theta\cos\phi + \sin\theta\sin\phi\cos\phi.$$

Putting $d\omega = \sin\theta \, d\theta \, d\phi$,

$$P = \int_0^{\frac{\pi}{2}}\int_0^{2\pi} \frac{2uN}{U^2} \cos^2\theta \sin\theta (\cos\theta\cos\psi + 2\theta\sin\psi\cos\phi) \, d\theta \, d\phi$$

$$= \frac{\pi N u \cos\psi}{U^2} \qquad = \frac{Ru\cos\psi}{U^2}.$$

The change in the tangential stress is evidently in the direction AC, that of the component of u in the plane of A.

We may therefore resolve each element of tangential stress in the direction AC. Omitting the first term again, since in this case it disappears on integration, the element due to $d\omega$ in the direction AP will contribute

$$\frac{N \cos\theta \sin\theta \cos\phi}{U} \cdot \frac{2u\cos\chi}{U} \, d\omega,$$

and integrating over the hemisphere we have

$$T = \int_0^{\frac{\pi}{2}}\int_0^{2\pi} \frac{2uN}{U^2} \cos\theta \sin^2\theta \cos\phi (\cos\theta\cos\psi + \sin\theta\sin\psi\cos\phi) \, d\theta \, d\phi$$

$$= \frac{\pi N u \sin\psi}{2U^2} \qquad = \frac{Ru\sin\psi}{2U^2}.$$

Force on a Sphere moving with Velocity "u" in a Given Direction.

If a sphere, radius a, is moving with velocity u, we may from symmetry resolve the forces on each element in the direction of motion. The resolutes will be $P\cos\psi$ and $T\sin\psi$. Evidently it is sufficient to integrate over the front hemisphere and then double the result. We have the

$$\text{Retarding Force} = 2\int_0^{\frac{\pi}{2}} \left(\frac{Ru\cos^2\psi}{U^2} + \frac{Ru\sin^2\psi}{2U^2}\right) 2\pi a^2 \sin\psi \, d\psi$$

$$= \tfrac{8}{3} \frac{Ru}{U^2} \cdot \pi a^2.$$

It is noteworthy that one half of this is due to the normal, the other half to the tangential stresses.

If the sphere has density ρ the acceleration is obtained by dividing by $\frac{4}{3}\pi a^3\rho$, then

$$du/dt = -2\mathrm{R}u/\mathrm{U}^2\rho a.$$

Effect on Rotation.

If the sphere radius a is rotating with angular velocity ω, then any element of the surface λ from the equator is moving with linear velocity at $\omega \cos \lambda$ in its own plane. This does not affect the normal pressure, but it introduces a tangential stress opposing the motion

$$\mathrm{R}u/2\mathrm{U}^2 = \mathrm{R}a\omega \cos \lambda/2\mathrm{U}^2.$$

Taking moments round the axes and integrating over the sphere, we obtain a couple

$$\tfrac{4}{3}\pi a^3 \cdot \tfrac{2}{5} a^2 \frac{d\omega}{dt} = \frac{\mathrm{R}a\omega}{2\mathrm{U}^2} \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} 2\pi a^3 \cos^3 \lambda \, d\lambda,$$

whence

$$d\omega/dt = -\tfrac{5}{2}\mathrm{R}\omega/2\mathrm{U}^2\rho a.$$

The rate of diminution of ω is therefore of the same order as that of u.

To obtain an idea of the magnitude of the retardation of a moving sphere, let us suppose that one is moving through a stationary medium. Let its radius be $a = 1$ centim., its density $\rho = 5{\cdot}5$, its temperature 300° A.

Then

$$\frac{1}{u}\frac{du}{dt} = -\frac{2 \times 5{\cdot}32 \times 10^{-5} \times 300^4}{9 \times 10^{20} \times 5{\cdot}5}$$

$$= 1{\cdot}75 \times 10^{-16}.$$

This will begin to affect the velocity by the order of 1 in 10,000 in, say, 10^{12} seconds, or taking the year as $3{\cdot}15 \times 10^7$ seconds, in about 30,000 years.

The effect is inversely as the radius, so that a dust particle 0·001 centim. radius will be equally affected in 30 years.

The effect is as the fourth power of the temperature, so that with rising temperature it becomes rapidly more serious.

Equation to the Orbit of a Small Spherical Absorbing Particle Moving in a Stationary Medium Round the Sun.

It is evident from the above result, that the effect of motion on radiation pressure may be very considerable in the case of a small absorbing particle moving round the sun.

We shall take the particle as spherical, of radius a and distance r from the sun. We shall suppose the radius so small that the particle is of one temperature throughout, the

temperature due to the solar radiation which it receives, but that it is still so large as to be attracted much more than it is repelled by the sun. Both attraction and repulsion are inversely as the square of the distance, so that we shall have a central force which we may put as producing acceleration A/r^2, where A is constant.

We know that at the distance of the earth, putting $r = b$, $A/b^2 = 0{\cdot}59$ centim./sec.^{2}, say $0{\cdot}6$ centim./sec.^{2} Then $A = 0{\cdot}6b^2$. The force acting against the motion produces retardation $-2Ru/U^2\rho a$.

If S is the solar constant at the distance b, its value at distance r is

$$Sb^2/r^2.$$

Putting

$$4\pi a^2 R = \pi a^2 Sb^2/r^2$$

$$R = (S/4)\,(b^2/r^2),$$

then the acceleration in the line of motion is

$$-\frac{Sb^2}{2U^2\rho a}\cdot\frac{u}{r^2} = -\frac{T\dot{s}}{r^2},$$

where $T = Sb^2/2U^2\rho a$, and $\dot{s}$ is now written for the velocity u.

The accelerations along and perpendicular to the radius vector give the equations

$$\ddot{r} - r\dot{\theta}^2 = -\frac{A}{r^2} - \frac{T\dot{s}}{r^2}\frac{dr}{ds} \quad \ldots\ldots\ldots (1),$$

$$\frac{1}{r}\frac{d}{dt}(r^2\dot{\theta}) = -\frac{T\dot{s}}{r^2}\frac{rd\theta}{ds} \quad \ldots\ldots\ldots (2).$$

From (2) we get

$$\frac{d}{dt}(r^2\dot{\theta}) = -\frac{Td\theta}{dt},$$

whence

$$r^2\dot{\theta} = C - T\theta \quad \ldots\ldots\ldots (3),$$

where C is the constant of integration.

If θ is 0 when $t = 0$, then C is the initial value of $r^2\dot{\theta}$. Further, as θ increases $r^2\dot{\theta}$ decreases and is 0 when $\theta = C/T$. This gives a limit to the angle described.

Equation (1) may be written

$$\ddot{r} - r\dot{\theta}^2 = -A/r^2 - Tr/r^2 \quad \ldots\ldots\ldots (4).$$

Putting u for r^{-1}

$$\dot{r} = \frac{dr}{d\theta}\dot{\theta} = -\frac{1}{u^2}\frac{du}{d\theta}\dot{\theta} = -(C - T\theta)\frac{du}{d\theta} \text{ from (3)},$$

$$\ddot{r} = T\dot{\theta}\frac{du}{d\theta} - (C - T\theta)\frac{d^2u}{d\theta^2}\dot{\theta}$$

$$= T(C - T\theta)u^2\frac{du}{d\theta} - (C - T\theta)^2u^2\frac{d^2u}{d\theta^2} \text{ from (3)}$$

Substituting in (4)

$$\frac{d^2u}{d\theta^2} + u = \frac{A}{(C - T\theta)^2}.$$

This can probably only be integrated by approximation. We can see the effect on the motion at the beginning by putting

$$\frac{d^2u}{d\theta^2} + u = \frac{A}{C^2}\left(1 + \frac{2T}{C}\theta\right),$$

since T/C is small if we begin at the distance of the earth and with a particle having the velocity of the earth.

An integral of this is

$$u = \frac{A}{C^2}\left(1 + \frac{2T}{C}\theta\right).$$

The complementary function will be periodic and may be omitted. To the order of approximation adopted

$$r = \frac{C^2}{A}\left(1 - \frac{2T}{C}\theta\right) \quad \text{and} \quad \dot{r} = -\frac{2CT}{A}\dot{\theta}.$$

Then initially

$$\dot{r}/r = -(2T/C)\,\dot{\theta}.$$

In applying these results, we may note that $T = Sb^2/2U^2\rho a$ is constant for all distances, and that b, the earth's distance, is 493 U. Inserting the value of the solar constant, $0{\cdot}175 \times 10^7$, and taking $\rho = 5{\cdot}5$, we get

$$T = 3{\cdot}9 \times 10^{10} . a^{-1}.$$

C will depend on the initial conditions. Assuming that the body considered is initially moving in a circle, then, at the beginning

$$r\dot{\theta}^2 = \frac{A}{r^2} \quad \text{or} \quad \dot{\theta} = \sqrt{\frac{A}{r^3}} = \sqrt{\frac{0{\cdot}6b^2}{r^3}},$$

since at $r = b$ the acceleration to the centre is 0·6.

Then

$$C = r^2\theta = \sqrt{0{\cdot}6b^2 r}.$$

Substituting these values in $\dot{r}/r$ we have

$$\frac{\dot{r}}{r} = -\frac{7{\cdot}8 \times 10^{10}}{r^2 a}.$$

This gives only the initial value of $\frac{\dot{r}}{r}$ and cannot be taken to hold for a time which will make $T^2\theta^2/C^2$ appreciable. But by (3) we see that $r = 0$ if $\theta = C/T$, so that

$C/2\pi T$ is a superior limit to the number of revolutions, even if we suppose the way clear right up to the centre.

Putting the numerical values we get

$$C/2\pi T = 61 r^{\frac{1}{2}} a.$$

Suppose, for example, that $r = b = 493 \times 3 \times 10^{10}$; $a = 1$, then

$$\dot{r}/r = -3{\cdot}5 \times 10^{16}.$$

If we multiply by $3{\cdot}15 \times 10^7$, the seconds in a year, $(\dot{r}/r) \times 3{\cdot}15 \times 10^7 = 1{\cdot}1 \times 10^{-8}$.

This implies that a sphere 1 centim. radius and density 5·5, starting with the velocity of the earth, and at its distance from the sun, will move inwards $\frac{1}{10{,}000}$ of its distance in about 10,000 years. It cannot in all make so many as $61 \times b^{\frac{1}{2}} = 2{\cdot}35 \times 10^8$ revolutions.

If we put $a = 0{\cdot}001$ centim., since the effects are inversely as a, then its distance will decrease by about 1 in 10,000 in 10 years, and it cannot make in all so many as $2{\cdot}35 \times 10^5$ revolutions.

If instead of starting from the distance of the earth, the particle starts from, say, 0·1 the distance, the effect in the radius is 100 times as great and the number of revolutions is $\sqrt{10}$ times less. Then with radius 1 centim. the distance decreases by $\frac{1}{10{,}000}$ in 100 years, and there are not so many as 80,000 revolutions, while with radius 0·001 centim. the distance decreases by $\frac{1}{10{,}000}$ in 0·1 year, and there are not so many as 80 revolutions.

Small particles, therefore, even of the order of 1 centim. radius, would be drawn into the sun, even from the distance of the earth, in times not large compared with geological times, and dust particles if large enough to absorb solar radiation would be swept in in a time almost comparable with historical times. Near the sun the effects are vastly greater. The application to meteoric dust in the system is obvious.

There should be a similar effect with dust and small particles circulating round the earth. If, for example, any of the Krakatoa dust was blown out so far beyond the appreciable atmosphere, and was given such motion that the particles became satellites to the earth, at no long time the dust will return. A ring of dust particles moving round a planet and receiving heat either from the sun or from the planet will tend to draw in to the planet.

[*Note added October* 31.—Since the foregoing paper was printed I have re-examined the theory of the pressure on a fully radiating surface when in motion, and have come to the conclusion that the change in pressure due to the motion is only half as great as that obtained on p. 545. In that investigation the pressure was assumed to be equal to the energy density, whether the surface was at rest or in

motion, whereas it appears, if the following mode of treatment is correct, that the pressure on a radiating surface moving forward is only $1 - \frac{u}{U}$ of the energy density of the radiation emitted.

Let us suppose that a surface A, a full radiator, is moving with velocity u towards a full absorber B, which, with the surroundings, we will suppose at 0° A. Consider for simplicity a parallel pencil issuing normal from A with velocity U towards B. Let the energy density in the stream from A be E when A is at rest, and E′ when it is moving. Let the pressure on A be $p = E$ when it is at rest, and p' when it is moving. When moving, A is emitting a stream of momentum p' per second and this momentum ultimately falls on B. Let A start radiating and moving at the same instant; let it move a distance d towards B, and then let it stop radiating and moving. It emits momentum p' per second for a time d/u and therefore emits total momentum $p'd/u$. Since B is at rest, the pressure on it, the momentum which it receives per second, is E′. But since A is following up the stream sent out, B does not receive through a period as long as d/u, but for a time less by d/U. If we assume that the total momentum received by B is equal to the total sent out by A, we have

$$p'd/u = E'(d/u - d/U),$$

or

$$p' = E'(1 - u/U).$$

To find E′ in terms of E we must make some assumption as to the effect of the motion on the radiation emitted. In the paper I have assumed that the emitting surface converts the same amount of its internal energy per second into radiant energy as when it is at rest, but that $p'u$ of the energy of motion of the radiating mass is also converted into radiant energy. Since the radiation emitted in one second is contained in length $U - u$, we have

$$E'(U - u) = EU + p'u = EU + E'\left(\frac{U-u}{U}\right)u,$$

whence

$$E' = E\frac{U^2}{(U-u)^2} = E(1 + 2u/U).$$

The same result is obtained if we assume that the amplitude of the emitted waves is the same whether the surface is moving or not, and that the energy density is inversely as the square of the wave-length for given amplitude.

We have, therefore, if the above application of the equality of action and reaction is justified,

$$p' = E'\left(1 - \frac{u}{U}\right) = E\frac{U}{U-u} = p\left(1 + \frac{u}{U}\right).$$

In a similar way we can find the effect of motion of an absorber on the pressure against it due to the incident radiation.

Let a stream of energy density E be incident on a fully absorbing surface moving towards the source with velocity u. Let the surface be at 0°A, so as to obtain the effect of the incident radiation only. When the surface is at rest, we may regard the stream as bringing up momentum E per second, or as containing momentum of density E/U brought up with velocity U to it. If the surface is moving towards the source, it takes up in one second the momentum in length $U + u$, or receives $\frac{E}{U}(U + u)$, and the pressure on it is $p' = E\left(1 + \frac{u}{U}\right) = p\left(1 + \frac{u}{U}\right)$.

It is easy to show that when a perfect reflector is moving, the pressure upon it is altered from p to $p\left(1 + \frac{2u}{U}\right)$.

In the paper, the case of a full radiator in an enclosure at zero has alone been considered, so that the correcting factor is $1 + \frac{u}{U}$ or $1 + \frac{u \cos \chi}{U}$ when the motion is at χ to the line of radiation. Hence the forces obtained in the paper when the factor was $1 + \frac{2u}{U}$ are all double those obtained with the factor now given. The process of drawing in small particles to the sun is correspondingly lengthened out.

It is, perhaps, worth noting that the motion of a body round the sun produces a small aberration effect. If the body is a sphere, the sunlight does not fall on the hemisphere directly under the sun, but on one turned round through an angle u/U. The pressure of the radiation, though still straight from the sun, does not act through the centre but through a point $\frac{u^2}{2U^2} \times$ radius of sphere in front of the centre. Thus, in the case of the earth, it will tend to stop the rotation. But the effect is so minute that if present conditions as to distance and radiation were maintained, it would take something of the order of 10^{19} years to stop the whole of the rotation.]

An Enquiry into the Nature of the Relationship between Sun-spot Frequency and Terrestrial Magnetism.

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CONTENTS.

Sections.		Page
1–2.	Introductory	151
3–4.	Milan declination ranges	152
5–8.	Greenwich declination and horizontal force ranges	154
9.	Comparison of calculated and observed values at Kew.	159
10–11.	Pawlowsk ranges from mean monthly diurnal inequalities	160
12.	„ „ „ annual „	163
13–14.	„ „ daily, monthly and yearly maxima and minima	163
15–16.	„ comparison of calculated and observed values	164
17.	„ disturbance data.	165
18–19.	„ comparison of results answering to observed and smoothed sun-spot frequencies	166
20.	Katharinenburg ranges from mean monthly diurnal inequalities	168
21.	„ „ daily maxima and minima.	169
22.	„ „ mean annual diurnal inequality, &c.	170
23.	„ comparison of calculated and observed values	171
24.	„ disturbance data	172
25–26.	Batavia variation of phenomena throughout the year	173
27–30.	„ diurnal inequalities	175
31.	„ Fourier series coefficients	177
32–35.	„ disturbance data	178
36–37.	Mauritius ranges from daily maxima and minima	181
38.	„ „ diurnal inequalities, &c.	184
39.	„ comparison of calculated and observed values	184
40.	Summary	185

§ 1. IN a recent paper,* termed here for brevity (A), I considered the relationship between certain phenomena of terrestrial magnetism on "quiet" days at Kew and WOLFER'S sun-spot frequency. Some contemporaneous French and German magnetic data were also referred to, but in no great detail. I have now gone more fully into the question, in order to find out whether any of the phenomena conspicuous at Kew are peculiar to the place or to the period of time formerly dealt with.

* 'Phil. Trans.,' A, vol. 202, p. 335.

Assuming the relation between any magnetic quantity R—such as the daily range of declination—and sun-spot frequency S to be of the simplest type,

$$R = a + bS. \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1),$$

I determined the values of the constants a and b in a number of cases. The chief results were as follows:—

Supposing each month of the year treated separately, it was found that both a and b were conspicuously lower in "winter" (the four months November to February) than at the "equinoxes" or in "summer" (May to August); but b/a was larger in "winter" than at the "equinoxes," and larger at the "equinoxes" than in "summer." The b constants were generally fully larger at the "equinoxes" than in "summer," but to this there were exceptions.

The values of b/a were distinctly larger in the case of inclination and horizontal force than in the case of declination and vertical force; generally they were larger for inclination than for horizontal force, and larger for declination than for vertical force.

In all the elements b/a was larger when R represented the sum of the 24 hourly differences from the mean value for the day than when it represented the range in the diurnal inequality.

In (A) the letters D, I, H, V were used for declination, inclination, horizontal force and vertical force respectively. This practice is continued here when it tends to brevity.

§ 2. The first question now to be considered is as to the dependence of a and b on the particular period to which the magnetic and sun-spot data refer.

This is not so simple as might appear at first sight. Very few observatories have magnetic records extending over any large number of years, and in the few cases where such long records exist their homogeneousness is seldom, if ever, beyond dispute. There has usually been change both in the apparatus and its environment, and it is difficult even for those in immediate charge of an old observatory to know what allowance ought to be made to put old and new records on a common footing. This is especially true of V and I. The element where least uncertainty should prevail is D, but even here there is usually cause for doubt.

Milan Declination Ranges.

§ 3. RAJNA* has recently considered a long series of data representing the mean value for each year of the diurnal range of D at Milan. Since 1871 the range seems to have been determined from regular daily observations at 8 A.M. and 2 P.M.; but previous to that date there seems to have been some lack of strict uniformity. RAJNA has calculated values for a and b in the formula (1) from the data for the 59 years 1836 to 1894, and independently for the 24 years 1871 to 1894, employing

* 'Rendiconti del R. Ist. Lomb.,' Series II., vol. 35, 1902.

the method of least squares. The formulæ he thus obtains, and one which he quotes as obtained by WOLFER, are as follows:—

$$\text{RAJNA} \ldots \begin{cases} 1836 \text{ to } 1894, \ R = 5{\cdot}31 + 0{\cdot}047\,S \ldots (I.), \\ 1871 \text{ ,, } 1894, \ R = 5{\cdot}39 + 0{\cdot}047\,S \ldots (II.), \end{cases}$$

$$\text{WOLFER} \ldots R = 5{\cdot}67 + 0{\cdot}040\,S \ldots (III.).$$

WOLFER'S value 0·040 for b is based on data from Christiania, Prague, Greenwich and Vienna, as well as from Milan. RAJNA compares the values calculated from each of the three formulæ with the ranges observed at Milan from 1836 to 1901. Formula (I.) agrees rather better than (II.) with observation; formula (III.) seems distinctly inferior. The difference between the observed values and those calculated from (I.) varies from $-$ 1′·87 in 1838 to $+$ 1′·87 in 1866, the extreme values observed in R being 4′·21 and 12′·03. Since 1871 the agreement seems decidedly improved. Over the 24 years for which it was originally calculated (II.) gives a "probable error" of only 0′·21, the difference between observed and calculated values varying from $-$ 0′·49 to $+$ 0′·53.

RAJNA himself notices that there are several long runs of the same sign in the differences between observed and calculated values. Thus from 1837 to 1850 the observed value is in excess of the calculated (from either (I.) or (II.)) 12 out of 14 times; on the other hand, in the 14 years 1854 to 1867, the calculated value is 13 times in excess. In the 11 years 1890 to 1900 (to which the Kew data treated in (A) referred) RAJNA'S calculated value from either (I.) or (II.) has been in excess 8 times, including every year since 1893.

The two first specified predominances of one sign are certainly in excess of what one would expect from pure chance. To throw some further light on the question, I have calculated values for a and b for the above-mentioned series of years. Instead of least squares, I grouped the years, following the method explained in (A), § 52. The grouping of years and the corresponding mean values of R and S were as follows:—

	Mean R.	Mean S.
Period 1837 to 1850—	9′·270	68·9
Years of sun-spot maximum, 1837, 1838, 1839, 1847, 1848, 1849 . .	10·950	107·7
,, ,, minimum, 1841 to 1845	7·552	25·4
Period 1854 to 1867—	6·586	41·4
Years of sun-spot maximum, 1858 to 1862	8·176	76·1
,, ,, minimum, 1854, 1855, 1856, 1865, 1866, 1867 . .	5·245	14·3
Period 1890 to 1900—	7·163	41·7
Years of sun-spot maximum, 1892 to 1895	8·753	75·0
,, ,, minimum, 1890, 1899, 1900.	5·587	9·5

The values found in the several cases for a, b and b/a, with the corresponding values from RAJNA'S formula (I.), appear in Table I.

TABLE I.—Milan Declination Ranges.

Period of years . . .	1837 to 1850.	1854 to 1867.	1890 to 1900.	1836 to 1894 (RAJNA).
a	6′·43	4′·62	5′·14	5′·31
b	·0413	·0474	·0484	·047
$10^4 \times (b/a)$	64	103	94	89

§ 4. It is certainly satisfactory that the values of a and b for the period 1890 to 1900 differ so little from RAJNA'S values for the long period 1836 to 1894. The probable error, employing my values of a and b, is only some 4 or 5 per cent. less than that found when employing RAJNA'S values for the long period.

In considering the results for the two earlier periods, we must remember the want of homogeneousness referred to above. The mere existence of RAJNA'S formula (I.) seems, however, evidence that, in his opinion, the want of homogeneousness is not serious, and the similarity of formulæ (I.) and (II.) to a certain extent supports this view.

The period 1837 to 1850 gives a very high value for a and a distinctly low value for b. The outstanding features of this period were the high mean sun-spot frequency, and the largeness of the declination range in the years of sun-spot minimum. Unless the results are very sensibly affected by heterogeneousness in the data, we must conclude that values calculated for a and b from a period as long as 14 years *may* depart somewhat widely from those calculated from a different equal or longer period. The range of variability would seem least in b and (naturally) greatest in b/a.

The value calculated for b from the period 1854 to 1867 agrees well with RAJNA'S, but the value found for a is distinctly lower than his. The sun-spot frequency during this period presented similar features to those occurring in the 11 years 1890 to 1900.

Greenwich Declination and Horizontal Force Ranges.

§ 5. A second long series of data is that employed by Mr. ELLIS in two papers,* in which he compares D and H ranges at Greenwich with sun-spot frequency. Mr. ELLIS gives the observed D and H ranges from the diurnal inequalities for each month of the period 1841 to 1896. These are based on *all* days, excluding those of

* 'Phil. Trans.,' vol. 171, for 1880, p. 541; 'Proc. Roy. Soc.,' vol. 63, 1898, p. 64.

large disturbance. Corresponding "quiet" day data appear in Mr. ELLIS' second paper for the 8 years 1889 to 1896. Mr. ELLIS specifies several sources which may have introduced some heterogeneousness into the earlier data as compared to the later. Prior to 1848 there were only eye readings at 2-hour intervals, whereas subsequently hourly data were available. Prior to 1864, when the magnetographs were transferred to a new building, some uncertainty seems to have prevailed as to the temperature correction for H, and the data for 1864 itself seem to be interpolated. The data subsequent to 1864 would seem to be strictly homogeneous.

§ 6. Mr. ELLIS employed no formula, and, whilst his graphical method appeals readily to the eye, it does not lend itself immediately to the present investigation.

I have accordingly calculated values for a and b for each month of the year in both D and H for the following periods: 1841 to 1896, 1865 to 1896, and 1889 to 1896 for both "all" and "quiet" days. In treating the first period, use was made of a group of sun-spot maximum years composed of 5 sub-groups each of 3 years, viz., 1847 to 1849, 1859 to 1861, 1870 to 1872, 1882 to 1884, and 1892 to 1894. The corresponding sun-spot minimum group consisted similarly of 15 years, made up of 5 sub-groups, viz., 1842 to 1844, 1854 to 1856, 1865 to 1867, 1877 to 1879 and 1888 to 1890.

For the period 1865 to 1896 the groups of sun-spot maximum and sun-spot minimum years were composed in either case of the last 3 sub-groups specified above.

For the period 1889 to 1896 the groups were: 1892 to 1895 for sun-spot maximum, and 1889 to 1890 for sun-spot minimum.

The values thus found for a, b and b/a appear in Tables II. and III. In addition to values for the individual months, the tables give values for winter, equinox and summer—each comprised of 4 months, as explained in § 1—and for the year. These seasonal and yearly values of a and b are simply arithmetic means of the individual monthly values; the seasonal and yearly values of b/a are derived from the seasonal and yearly values of a and b. The tables also supply corresponding data for Kew as given in (A), Table XL.

TABLE II.—Greenwich and Kew (unit 1′).

Ranges from Mean Monthly Diurnal Inequalities of Declination.

	a.					10^4b.					$10^4b/a$.				
	1841–96.	1865–96.	1889–96.		Kew.	1841–96.	1865–96.	1889–96.		Kew.	1841–96.	1865–96.	1889–96.		Kew.
			All.	Quiet.				All.	Quiet.				All.	Quiet.	
January . .	5·08	4·62	4·47	3·71	3·16	269	308	263	313	307	53	67	59	84	97
February . .	6·25	5·75	5·16	4·37	3·55	259	277	401	347	383	41	48	78	80	108
March . . .	7·32	7·10	6·86	6·29	7·13	502	504	602	719	526	68	71	88	114	74
April . . .	9·26	9·24	8·83	9·19	8·56	471	454	480	332	508	51	49	54	36	59
May . . .	8·57	8·45	8·24	8·22	9·34	444	443	487	544	401	52	52	59	66	43
June . . .	8·75	8·81	8·10	8·04	8·45	442	446	501	517	504	51	51	62	64	60
July . . .	8·70	8·83	7·94	8·08	8·75	421	428	542	488	387	48	49	68	60	44
August. . .	8·96	8·91	8·48	8·10	9·11	417	433	385	466	421	47	49	45	58	46
September. .	8·01	7·44	6·71	6·54	7·48	403	516	535	596	517	50	69	80	91	69
October . .	6·98	6·51	6·59	6·05	6·13	336	381	304	297	361	48	58	46	49	59
November. .	5·34	5·28	5·16	4·31	3·60	285	266	268	215	369	53	51	52	50	102
December . .	4·28	3·94	3·97	3·38	2·62	270	295	249	145	234	63	75	63	43	89
Winter. . .	5·24	4·90	4·69	3·94	3·23	271	287	295	255	323	52	59	63	65	100
Equinox . .	7·89	7·57	7·25	7·02	7·32	428	464	480	486	478	54	61	66	69	65
Summer . .	8·75	8·75	8·19	8·11	8·91	431	438	479	504	428	49	50	58	62	48
Year . . .	7·29	7·07	6·71	6·36	6·49	377	396	418	415	410	52	56	62	65	63

TABLE III.—Greenwich and Kew (unit 1γ).

Ranges from Mean Monthly Diurnal Inequalities of Horizontal Force.

	a.					10^3b.					$10^4b/a$.				
	1841–96.	1865–96.	1889–96.		Kew.	1841–96.	1865–96.	1889–96.		Kew.	1841–96.	1865–96.	1889–96.		Kew.
			All.	Quiet.				All.	Quiet.				All.	Quiet.	
January . .	14·2	10·7	11·4	11·2	11·6	157	147	116	181	118	110	137	102	162	101
February . .	13·8	11·0	13·0	15·1	10·5	203	187	143	219	172	147	170	110	145	164
March . . .	21·9	19·7	19·6	17·8	19·3	231	233	307	372	238	105	118	156	209	124
April . . .	33·3	32·2	29·7	31·5	25·7	265	246	310	262	284	79	76	104	83	111
May . . .	35·4	32·6	31·6	34·4	29·6	211	248	260	214	219	60	76	82	62	74
June . . .	36·7	33·4	34·1	37·2	32·6	223	301	281	194	142	61	90	82	52	44
July . . .	35·9	34·5	32·0	31·1	28·6	248	268	315	261	238	69	78	98	84	83
August. . .	35·8	32·9	33·3	38·3	31·6	169	234	238	154	160	47	71	72	40	51
September. .	32·8	30·3	31·7	30·1	27·0	155	205	178	223	192	47	68	56	74	71
October . .	27·1	24·5	24·1	29·0	22·2	142	182	201	130	171	52	74	83	45	77
November. .	15·9	13·7	13·8	15·3	13·0	168	180	177	237	225	106	132	128	155	173
December. .	13·6	8·2	10·6	9·1	6·7	108	145	91	114	131	80	176	86	125	193
Winter. . .	14·4	10·9	12·2	12·7	10·5	159	165	132	188	161	111	151	108	148	145
Equinox . .	28·8	26·6	26·3	27·1	23·5	198	216	249	246	221	69	81	95	91	94
Summer . .	35·9	33·4	32·7	35·2	30·6	213	263	274	206	190	59	79	83	58	62
Year . . .	26·4	23·6	23·7	25·0	21·5	190	215	218	213	191	72	91	92	85	89

§ 7. In the case of D, Table II., we see on the whole a close resemblance between the results from the two longest series of data. The later period shows, however, a slightly increased value of b and a slightly decreased value of a in winter, equinox, and the year as a whole. The last period, 1889–96, in the "all" day data shows a further increase in b and decrease in a; and the corresponding "quiet" day results give a still smaller value of a, especially in the winter months. The "all" and "quiet" day mean values of b for the year, from the 1889–96 period at Greenwich, are practically identical and very close to the corresponding Kew value. The values of b/a at Greenwich are in each season slightly larger for the "quiet" days than for the corresponding "all" days; and comparing the "all" day data amongst themselves we have an increase in b/a in passing from the longest to the mean period, and in passing from the mean period to the shortest period. This would imply that b/a has increased of late years.

At Greenwich, as at Kew, b is conspicuously lowest in "winter"; but no one of the four columns of Greenwich results gives so distinct an excess in the equinoctial over the summer value as appears at Kew, and, on the whole, we should infer that the equinoctial and summer values of b at Greenwich are practically equal.

At Greenwich, as at Kew, b/a is distinctly smaller in summer than in the other seasons; but the "winter" value of b/a at Greenwich, instead of markedly exceeding the values for the other seasons, as at Kew, would seem to be if anything slightly smaller than the equinoctial.

On the whole, the variation of b/a throughout the year at Greenwich is surprisingly small.

§ 8. The H ranges in Mr. ELLIS' tables are expressed in terms of the value of H at Greenwich. To make the results comparable with those for other stations, I have expressed the ranges in terms of 1γ as unit. In doing so, I treated H as constant for each period, and as possessing the following values:—

Period.	Value of H.
	C.G.S.
1841–96	·179
1865–96	·180
1889–96	·1829

Not knowing the exact procedure followed at Greenwich, I may not unlikely differ slightly from the exact values adopted there; but, for the purpose of the present enquiry, such small uncertainty as may exist is immaterial. The values of b/a are, of course, independent of the unit adopted.

The 1841–96 and 1865–96 data in Table III. present some conspicuous differences; a is larger in the former series than in the latter in every single month of the year, but b shows exactly the opposite phenomenon in 9 months out of the 12. This

implies a very conspicuous difference between the phenomena in years prior and subsequent to 1864. Not improbably the want of homogeneousness in the earlier data, already referred to, may be partly accountable for the apparent change. At all events, the results for the final period, 1889–96, show no distinct progressive diminution of a or increase of b as compared to the period 1865-96. In fact, the "all" day data for these two periods, and the "quiet" day data for the shorter period, give almost identical values for the mean b for the year.

As regards the seasonal phenomena, each set of Greenwich data makes b conspicuously least, but b/a conspicuously largest, in "winter." The December value of b is invariably the smallest. The "all" and "quiet" day data for 1889–96, as already stated, give very nearly the same mean value of b for the year, but the "quiet" days' value for b is much the larger of the two in winter, and the smaller in summer. The "quiet" day data at Greenwich present a remarkable similarity to the corresponding Kew data, as is best seen by comparing the seasonal values for b/a. The fact, however, that the absolute values of both a and b are some 10 per cent. higher at Greenwich than at Kew is rather suggestive of some misapprehension as to the scale values at one or both observatories.

§ 9. In cases such as the present, a comparison of calculated and observed values is useful. The Greenwich data do not lend themselves very readily to this, as Mr. ELLIS does not give mean values for individual years, and the interest attaching to such a comparison for individual months of the year seems hardly sufficient to justify the necessary labour. In (A), § 75, some results were given for individual months of the year at Kew, but none for the year as a whole. This information is accordingly now supplied in Table IV., so far as concerns the ranges and the sum of the 24 hourly differences from the mean in the mean diurnal inequalities for the year in the several elements. The calculated values are derived from the values given for a and b in (A) Table XLIV. From the mathematical standpoint the nicety of agreement is best judged by considering the last line in Table IV., which shows what percentage the probable error in a calculated value is of the total variation exhibited by the element in the 11-year period. For practical purposes the mean difference between the calculated and observed values, and the percentage it forms of the absolute mean value of the element, are, however, fully as important.

It will be seen that the agreement is about equally good for the ranges and for the sum of the 24 differences. It is, on the whole, slightly better for D and H than for V and I.

TABLE IV.—Kew (Units 1′ for Angles, 1γ for Force Components).
Observed less Calculated Values.

Year.	Range from mean diurnal inequality for the year.				Sum of the 24 hourly differences in the mean diurnal inequality for the year.			
	D.	H.	V.	I.	D.	H.	V.	I.
1890	+0·49	+ 0·5	—	—	+ 2·12	+ 0·5	—	—
1891	+ ·40	+ 3·0	+ 1·4	+0·21	+ 2·55	+ 16·5	+ 6·3	+0·86
1892	+ ·24	− 1·4	+ 1·5	− ·12	+ 2·22	− 6·8	− 0·2	− ·54
1893	+ ·32	+ 0·9	− 1·1	+ ·05	− ·86	+ 2·9	− 0·2	+ ·12
1894	− ·16	+ 0·8	− 0·9	+ ·09	− ·49	+ 9·9	− 3·7	+1·12
1895	− ·28	− 0·4	+ 0·4	− ·01	− 1·05	− 6·4	+ 0·8	− ·61
1896	− ·14	− 1·4	+ 0·4	− ·08	·00	− 6·6	+ 7·7	− ·76
1897	−·53	− 1·1	− 1·8	− ·05	− 1·68	− 6·4	−11·4	− ·24
1898	− ·41	− 1·9	− 0·2	− ·13	− 1·11	− 14·0	+ 0·3	− ·78
1899	+ ·07	+ 0·3	+ 1·2	− ·01	+ ·25	+ 8·3	+ 4·8	+ ·50
1900	+ ·01	+ 0·6	− 0·9	+ ·07	− 1·93	+ 2·3	− 4·2	+ ·33
Mean difference calculated ∽ observed	0·28	1·12	0·98	0·082	1·30	7·3	4·0	0·59
Probable error	0·23	0·95	0·78	0·071	1·09	6·1	3·8	0·46
Mean value of element	7·90	26·2	18·0	1·43	41·6	154·5	96·9	8·30
Range of element	3·54	15·5	7·5	0·95	21·0	108·1	37·1	6·35
Mean difference × 100 / mean value	4	4	5	6	3	5	4	7
Probable error × 100 / range of element	6	6	10	7	5	6	10	7

Pawlowsk Data (59° 41′ N. lat., 30° 29′ E. long.).

§ 10. Magnetic observations at the three Russian magnetic observatories at Pawlowsk, Katharinenburg, and Irkutsk are published very nearly on parallel lines under the auspices of the Central Physical Observatory at St. Petersburg. The results are very complete, and are kept well up to date. For the present enquiry I have selected Pawlowsk and Katharinenburg. The former is, I believe, the furthest north magnetic observatory which has been in continued existence for any length of time. Its results include very full details of diurnal maxima and minima, and of the amplitudes of movements in magnetic storms. They are not confined to "all" days, but give in addition full particulars for selected "quiet" days, or "normal" days as they were called by WILD, to whom the idea of their separate treatment is due.

I have treated the Pawlowsk data for the 11 years 1890 to 1900 by the method of groups, taking the same combination of years as for Kew, viz., 1892 to 1895 for sun-spot maximum, and 1890, 1899, and 1900 for sun-spot minimum.

Table V. refers to the ranges from the mean diurnal inequalities for the several months of the year, both from "all" and "quiet" days. The seasonal and yearly values of a and b are arithmetic means from the included months, and these arithmetic means are employed in calculating the seasonal and yearly values of b/a.

TABLE V.—(Units 1′ for Angles, 1γ for Force Components.)

Ranges from Mean Monthly Diurnal Inequalities at Pawlowsk.

	Declination.						Horizontal force.						Vertical force.						Inclination.		
	a.		10^4b.		$10^4b/a$.		a.		10^3b.		$10^4b/a$.		a.		10^3b.		$10^4b/a$.		a.	10^4b.	$10^4b/a$.
	All.	Quiet.	All.	Quiet.	All.	Quiet.	All.	Quiet.	All.	Quiet.	All.	Quiet.	All.	Quiet.	All.	Quiet.	All.	Quiet.	All.	All.	All.
January .	4·12	1·95	203	254	49	130	8·0	8·5	99	89	123	104	9·5	3·4	133	22	140	64	0·71	65	88
February .	4·45	2·30	399	482	90	209	8·8	10·2	254	169	288	165	6·3	4·2	493	25	777	58	0·75	114	152
March . .	6·12	6·12	693	735	113	120	22·8	19·5	247	316	108	162	11·9	8·8	484	16	407	18	1·51	156	103
April . .	8·92	9·30	482	477	54	51	33·4	31·2	314	258	94	83	15·3	10·5	206	60	135	57	1·95	202	104
May . .	9·58	9·97	601	676	63	68	35·3	32·0	271	311	77	97	18·0	11·8	190	38	105	32	2·04	158	78
June . .	9·60	10·91	587	522	61	48	32·3	34·2	373	230	115	67	9·5	9·3	238	66	252	71	1·95	205	105
July . .	9·55	9·92	507	532	53	54	31·0	30·9	393	247	127	80	5·7	10·3	381	62	674	60	1·90	211	111
August .	9·92	9·89	324	399	33	40	32·8	33·6	250	135	76	40	11·4	8·9	161	35	141	40	2·03	134	66
September	7·06	7·64	364	383	52	50	28·5	29·7	233	172	82	58	8·9	4·5	310	102	348	227	1·69	184	109
October .	4·81	5·49	495	340	103	62	22·5	21·9	224	213	100	97	7·8	4·9	287	60	365	122	1·47	170	116
November	3·78	2·87	502	307	133	107	10·1	10·1	189	212	187	210	4·4	3·8	395	22	894	57	0·65	156	95
December	3·82	1·85	201	202	52	109	7·9	4·6	74	143	94	308	7·4	3·2	171	22	230	67	0·65	60	92
Winter .	4·04	2·24	326	311	81	139	8·7	8·4	154	153	177	183	6·9	3·7	298	23	430	61	0·69	99	143
Equinox .	6·73	7·14	509	484	76	68	26·8	25·6	254	240	95	94	11·0	7·2	322	59	293	83	1·66	178	107
Summer .	9·66	10·17	505	532	52	52	32·9	32·7	322	231	98	71	11·1	10·1	242	50	218	50	1·98	177	90
Year . .	6·81	6·52	446	442	66	68	22·8	22·2	243	208	107	94	9·7	7·0	287	44	297	63	1·44	151	105

§ 11. Table V. presents several novel features. In the declination we see a conspicuous difference between the variation of a throughout the year on "all" and on "quiet" days. In December and January the "all" day value of a is more than double the "quiet" day value, and the excess of the "all" day value is also prominent in November and February. On the other hand, the "quiet" day value of a is, in general, distinctly the larger throughout the equinoctial and summer months. There is no such prominent difference between the "all" and "quiet" day values of b for declination. There are, of course, conspicuous differences in one or two individual months, but the seasonal and yearly values are closely alike. The rise of b/a in winter and its fall in summer are conspicuous, especially in the "quiet" days, where the phenomenon is even more prominent than at Kew. The mean values of b/a for the year from "all" and from "quiet" days are in close agreement with one another and with the corresponding Kew value.

In H the seasonal and yearly values of a in "all" and in "quiet" days are much alike. The winter and equinoctial values of b in the two cases are also nearly equal, but in summer the "quiet" day value is very decidedly the smaller. The mean "all" day value of b for the year is distinctly larger than the "quiet" day value, which is itself slightly in excess of the corresponding Kew value. The excess of b/a in winter is conspicuous in both "all" and "quiet" days; in the latter case the variation of b/a throughout the year is pretty similar to that at Kew.

In V the "all" and "quiet" day phenomena are vitally different. The fact that the mean diurnal range during the 11-year period for the "quiet" days was barely 40 per cent. of that for "all" days prepares one for a material difference between the phenomena in the two cases, but hardly for the "all" day mean yearly value of b being more than six times the corresponding "quiet" day value. The "quiet" day value of a for summer is not much less than the "all" day value, but in the equinoctial and winter months the latter greatly predominates. The value of b is greatest at the equinox in both "all" and "quiet" days; in fact, in "all" days the summer value of b falls short of the winter value, notwithstanding a marked depression in December and January. The variation of b/a throughout the year on "quiet" days is somewhat irregular. In "all" days we have the fall in summer and rise in winter seen at Kew, but there is a prominent depression in December and January. As regards the absolute magnitudes of b and b/a, the "quiet" day data are much closer than the "all" day to the Kew results.

Table V. gives only "all" day data for I, as no "quiet" day data for this element seem to be published.

Here again the phenomena resemble those observed at Kew, b being conspicuously small in winter and b/a small in summer. The values of a and b are, on the whole, distinctly larger than at Kew (where the diurnal range of I is less than at Pawlowsk), but the mean value of b/a for the year is 105×10^{-4} as compared with 111×10^{-4} at Kew.

§ 12. The data ascribed to the year in Table V. are arithmetic means from the 12 monthly values. Table VI. supplies values of a, b and b/a for the ranges from the mean diurnal inequality for the year as given in the Pawlowsk tables. They answer to the range data for Kew in Tables XLIII. and XLIV. of (A), and I give the results in the latter of these tables (calculated by least squares) for comparison.

TABLE VI.—(Units 1′ for angles, 1γ for Force Components.)

Mean Diurnal Inequality for the Year at Pawlowsk.

	Declination.			Horizontal force.			Vertical force.			Inclination.		
	a.	$10^4 \times b$.	$10^4 \times b/a$.	a.	$10^3 \times b$.	$10^4 \times b/a$.	a.	$10^3 \times b$.	$10^4 \times b/a$.	a.	$10^4 \times b$.	$10^4 \times b/a$.
All days . .	5·74	400	70	20·7	211	102	8·1	265	326	1·24	126	101
Quiet days .	6·17	424	69	20·6	195	95	5·9	27	46	—	—	—
Kew . . .	6·10	433	71	18·1	194	107	14·3	81	56	0·87	125	145

§ 13. The Pawlowsk tables give for each month the mean of the differences between the daily maxima and minima, irrespective of their time of occurrence. The range thus obtained is, of course, larger than that from the mean diurnal inequality for the month, and is a quantity considerably more influenced by magnetic disturbances. The mean of the 12 monthly means may be regarded as the mean for the year of the absolute ranges in individual days. This is the quantity to which the results in the first line of Table VII. apply. The figures in the second line refer to the mean of the 12 monthly ranges, a monthly range being defined as the difference between the highest and lowest values recorded during the month. The third line in the table refers to the annual range, *i.e.*, the difference between the highest and lowest values recorded during the year. Owing to occasional losses of trace, monthly and annual ranges are sometimes under-estimated, especially at times of large disturbance. Both quantities are mainly dependent on the amplitude of disturbances; the mean monthly range is the better measure of the generally disturbed character of the year.

TABLE VII.—Pawlowsk (Units 1′ for angles, 1γ for H and V).

	Declination.			Horizontal force.			Vertical force.		
	a.	$10^3 \times b$.	$10^4 \times b/a$.	a.	$10^2 \times b$.	$10^4 \times b/a$.	a.	$10^2 \times b$.	$10^4 \times b/a$.
Mean daily range . .	11·28	113	100	45·2	64	141	17·6	52	295
„ monthly range .	28·6	538	188	102	413	406	74	412	556
Annual range . . .	62·9	893	142	240	1226	510	338	698	207

§ 14. If we compare the results for the mean daily range in Table VII. with those for the range of the diurnal inequality in Table VI., we see that, though the values of a in Table VII. are about double those in Table VI. in the case of D and H, the increase in b is relatively so much greater that the values of b/a in Table VII. are some 40 per cent. in excess of those in the earlier table. This means that the amplitude of magnetic disturbance is in general more enhanced relatively in years of sun-spot maximum than is that of the regular diurnal inequality. The great rise in b/a as we pass from the mean daily to the mean monthly range in Table VII. is evidence of the same fact. That this rise in b/a is not continued, except in H, as we pass from the mean monthly to the annual range, is at least consistent with the view that the incidence of *exceptionally* large magnetic storms is determined by causes of which sun-spot frequency is no exact measure.

§ 15. Table VIII. supplies information as to the degree of accordance between the observed values of the ranges and those calculated from the values of a and b in Tables VI. and VII. Table VIII. is constructed on parallel lines to Table IV.

TABLE VIII.—Pawlowsk (Units 1′ for D and I, 1γ for H and V).

Observed less Calculated Values.

Year.	Ranges from mean diurnal inequalities.							Absolute mean daily ranges.		
	"Quiet" (normal) days.			"All" days.						
	D.	H.	V.	D.	H.	V.	I.	D.	H.	V.
1890	+0·2	+ 3	+ 1	+0·30	0	− 1	0·00	+ 0·06	− 1·1	− 0·2
1891	+0·3	+ 1	+ 2	+ ·15	+ 2	+ 2	+ ·10	+ 0·71	+ 2·5	+ 3·2
1892	+ ·6	− 4	+ 1	+ ·09	+ 1	+ 8	+ ·05	+ 1·51	+19·4	+17·5
1893	+ ·3	+ 2	+ 1	+ ·51	− 1	−11	− ·07	− 3·05	−20·5	−21·0
1894	+ ·3	+ 5	− 2	− ·28	+ 1	+ 1	− ·06	+ 0·33	+ 2·3	+ 3·4
1895	− ·8	− 1	− 1	− ·08	− 1	− 2	+ ·03	− 0·44	− 6·2	− 4·7
1896	− ·3	− 2	0	− ·02	− 1	+ 4	·00	+ 1·46	+ 2·0	+ 3·3
1897	− ·6	− 2	− 1	·00	0	0	+ ·02	+ 0·33	− 0·7	− 1·6
1898	− ·3	− 2	− 1	− ·55	0	+ 1	− ·02	+ 0·40	+ 5·0	+ 3·6
1899	− ·2	− 2	0	− ·20	+ 1	+ 1	+ ·04	+ 0·50	+ 4·9	+ 2·7
1900	+ ·3	+ 1	− 1	+ ·08	− 1	− 3	− ·08	− 1·81	− 7·6	− 6·2
Mean difference calculated ~ observed	0·38	2·3	1·0	0·21	0·8	3·1	0·043	0·96	6·56	6·13
Probable error	0·30	1·8	0·8	0·19	0·7	3·2	·037	0·91	6·60	6·27
Mean value of element	7·94	28·7	7·0	7·41	29·5	19·2	1·77	16·0	71·8	39·3
Range of element	3·6	20	4	3·62	16	27	0·96	10·5	67·4	56·7
$\frac{\text{Mean difference} \times 100}{\text{mean value}}$	5	8	14	3	3	16	2	6	9	16
$\frac{\text{Probable error} \times 100}{\text{range of element}}$	8	9	20	5	4	12	4	9	10	11

The calculated values of H and V employed in Table VIII. for the inequality ranges were taken only to the nearest 1γ, because the Pawlowsk tables go no nearer than this; but in the "all" days' D and I, both tables and calculation go to 0′·01. The agreement between calculated and observed values is much closer in D, H, and I than in V; and in D and H it is considerably closer for the "all" day than the "quiet" day results. Probably this only means that the fewness of the "quiet" days (sometimes only two or three a month) introduces an element of uncertainty which more than neutralises the effect of the greater regularity in these days.

§ 16. If the range of magnetic elements were largely dependent on influences which did not proceed *pari passu* with sun-spot frequency, then what we should expect to see in Table VIII. would be a notable occurrence of large + values in *all* the elements in some years, and of large − values in other years. The same result would follow if, while an intimate connection subsisted, it were not of the linear type assumed in (1).

So far as the inequality ranges in D, H, and I are concerned, there is no indication of such a phenomenon. There is indeed an excess of + signs from 1890 to 1894 and of − signs from 1895 to 1899, but the differences themselves are small, and those for the "all" and the "quiet" days show no kind of regular relationship. In the case, however, of the "all" day V inequality, and of the absolute daily ranges for all the elements, especially H and V, the observed values are conspicuously in excess of the calculated in 1892, and as conspicuously below them in 1893. This phenomenon seems due beyond a doubt to the influence of the disturbance element.

§ 17. With a view to further elucidation of the phenomenon described in the last paragraph, I have placed side by side in Table IX. data as to the mean value for each year of a variety of quantities which are affected in different degrees by magnetic disturbance. The small figures in brackets attached to the annual figures show the position which the year in question would occupy on a list which followed the order of magnitude of the quantity in question. If two yearly items are equal, a common number is attached. In the case of the years themselves, the attached figures indicate the order when the arrangement follows sun-spot frequency. It should, however, be noticed that the excess of sun-spot frequency in 1898 over 1897 was very trifling, and that the differences between 1899, 1900, and 1890 were not large.

In the case of the diurnal inequalities in D and H, quantities but little affected by disturbance, 1893 heads the list, just as it does in sun-spot frequency. In the case of the mean daily range—a quantity more influenced by disturbance—1892 and 1894 come to the front, and 1893 falls to the fourth place. Coming to the mean of the monthly ranges, we see 1892 and 1894 still more in advance, while in the case of H and V 1893 stands lower than 1898, a year of less than one-third its sun-spot frequency.

In the case of the annual range, 1893 has fallen to the eighth place in D and ninth place in V, whilst 1898 mounts to the third or even the second place.

In the mean daily, mean monthly, and annual ranges, 1892 and 1894 are as conspicuously in excess of what one would expect from sun-spot frequency as 1893 and 1895 are below it. Thus when we treat these four years as a unit, and compare it with a similar unit made up of the three years 1890, 1899, and 1900, we may arrive at a conspicuous connection between sun-spot frequency and amplitude of disturbance; but at the same time there is a marked absence of the close and regular connection in individual years which characterises the inequality ranges in D, H, and I.

TABLE IX.—Pawlowsk (Units 1′ for D, 1γ for H and V).

Year.	Diurnal inequality range.		Mean daily range.		Mean monthly range.			Annual range.		
	D.	H.	D.	H.	D.	H.	V.	D.	H.	V.
1890 (11)	6·32 (8)	22 (10)	12·14 (10)	49 (10)	28·2 (11)	118 (11)	80 (11)	42·1 (11)	169 (11)	179 (11)
1891 (6)	7·31 (6)	30 (5)	16·01 (6)	70 (6)	46·3 (7)	218 (7)	233 (5)	92·3 (6)	550 (5)	614 (4)
1892 (3)	8·75 (2)	37 (3)	21·04 (1)	111 (1)	93·6 (1)	698 (1)	575 (1)	194·0 (1)	2416 (1)	1385 (1)
1893 (1)	9·64 (1)	38 (1)	17·82 (4)	79 (4)	48·3 (4)	241 (4)	210 (7)	87·1 (8)	514 (6)	457 (9)
1894 (2)	8·58 (3)	38 (1)	20·42 (2)	97 (2)	84·1 (2)	493 (2)	493 (2)	145·6 (2)	1227 (2)	878 (3)
1895 (4)	8·22 (4)	33 (4)	18·07 (3)	80 (3)	47·4 (5)	220 (6)	223 (6)	73·9 (9)	395 (9)	534 (6)
1896 (5)	7·39 (5)	29 (6)	17·46 (5)	74 (5)	52·4 (3)	232 (5)	236 (4)	88·7 (7)	574 (4)	608 (5)
1897 (8)	6·79 (7)	26 (7)	14·57 (8)	61 (8)	43·8 (8)	201 (8)	170 (8)	101·1 (4)	449 (8)	480 (8)
1898 (7)	6·25 (9)	26 (7)	14·70 (7)	67 (7)	46·6 (6)	276 (3)	242 (3)	118·9 (3)	1136 (3)	888 (2)
1899 (9)	6·02 (11)	24 (9)	13·14 (9)	58 (9)	38·3 (9)	178 (9)	150 (9)	63·8 (10)	382 (10)	527 (7)
1900 (10)	6·20 (10)	22 (10)	10·54 (11)	44 (11)	32·8 (10)	134 (10)	89 (10)	94·2 (5)	457 (7)	365 (10)
Means	7·41	30	15·99	72	51·1	274	246	100·2	752	629

§ 18. It was pointed out in (A), §§ 74 and 75, that whilst an intimate general connection between sun-spot frequency and diurnal magnetic ranges is unmistakable, it is open to doubt whether the mean values of these quantities for so short a period as a single month can be regarded as directly interconnected.

If both phenomena proceed from a common cause whose intensity of action at a given instant varies throughout the solar system, then it might possibly be better to compare monthly magnetic ranges with sun-spot frequency for a longer overlapping period.

As shown in (A), Table I., the mean sun-spot frequency for individual months of the year from the period 1890 to 1900 varied from 35·0 in November and 35·5 in March to 45·4 in June and August. Clearly, if the connection between sun-spot frequency and magnetic range is of the more general kind indicated above, the values we have found for b and b/a at Kew and Pawlowsk will be too large in months such as November and March and too small in months such as June and August.

To obtain an outside estimate of the uncertainty thus existing, I have calculated values for a, b and b/a for the "quiet" day Pawlowsk data, employing WOLFER'S

smoothed sun-spot frequencies (Ausgeglichene Relativzahlen), each of which is a mean from observed values for 13 months, of which the individual month forms the central period. Table X. gives the mean seasonal and yearly values thus found; these answer precisely to the seasonal and yearly values based on observed sun-spot frequencies which appear in Table V.

TABLE X.—(Units 1′ for D, 1γ for H and V.)

Pawlowsk "Quiet" Days with WOLFER'S Smoothed Values (Ausgeglichene Relativzahlen).

	Declination.			Horizontal force.			Vertical force.		
	a.	$10^4 \times b$.	$10^4 \times b/a$.	a.	$10^3 \times b$.	$10^4 \times b/a$.	a.	$10^3 \times b$.	$10^4 \times b/a$.
Winter . . .	2·17	312	144	8·0	152	191	3·6	23	63
Equinox . .	7·29	428	59	26·2	216	82	7·4	55	74
Summer. . .	9·98	616	62	31·9	265	83	9·9	58	58
Year. . . .	6·48	452	70	22·0	211	96	7·0	45	65

So far as the mean yearly and winter values of a, b and b/a are concerned, Tables V. and X. are in practical agreement, but the equinoctial values of b in Table X. are decidedly lower, and the summer values decidedly higher, than the corresponding quantities in Table V. The fact that the equinoctial values of b/a for D and H in Table X. fall slightly below the summer ones seems hardly likely *à priori* to be a natural phenomenon, and it is not in accordance with the results obtained for Greenwich, in Tables II. and III., from the longer periods, where the variation of the mean sun-spot frequency from month to month is naturally less than in 1890 to 1900.

§ 19. The effect of the substitution of the smoothed sun-spot frequencies on the values of b and b/a from month to month is most easily followed by expressing the monthly values as percentages of their mean for the 12 months. Table XI. gives the mean of the results thus obtained for D and H, employing smoothed and observed sun-spot frequencies for the "quiet" days, and observed frequencies for the "all" days. The employment of smoothed frequencies for the "all" days would alter the results to about the same extent as it does in the "quiet" days.

The substitution of the smoothed for the observed sun-spot frequencies for "quiet" days removes an isolated prominence shown by the b variation in March, and removes slight depressions in June and August, but it produces a depression in September and adds materially to an already conspicuous prominence in May. Also the June depression and the March prominence are not apparent in the "all" day b variation using the observed sun-spots, and if we used smoothed frequencies for the "all" days we should have a marked depression in March and a largish prominence in June.

The b/a variation throughout the year proceeds most regularly when we use the observed frequencies.

TABLE XI.—Pawlowsk.

Variation of b and b/a throughout the Year.

	b.			b/a.		
	"Quiet" days.		"All" days.	"Quiet" days.		"All" days.
	Smoothed frequencies.	Observed frequencies.	Observed frequencies.	Smoothed frequencies.	Observed frequencies.	Observed frequencies.
January . . .	50	50	43	116	117	85
February. .. .	96	95	97	188	187	180
March. . . .	116	159	128	89	135	124
April	123	116	119	66	63	76
May	171	151	123	90	78	75
June	126	114	142	59	55	90
July	124	120	137	63	63	89
August . . .	103	77	88	53	39	54
September . .	71	85	89	40	52	69
October . . .	84	90	101	67	75	113
November . .	72	86	95	121	147	170
December . .	64	57	38	248	188	75

Katharinenburg (56° 49′ N. lat., 60° 38′ E. long.).

§ 20. Table XII. gives values of a, b and b/a for the range of the diurnal inequality for each month of the year, and arithmetic means for the seasons and the year, at Katharinenburg, corresponding exactly to the "all" day results for Pawlowsk given in Table V.

In D, b appears decidedly less at Katharinenburg than at Pawlowsk, especially in winter. The dip in the December and January values of b in Table XII. is particularly striking. The summer and equinoctial values of b/a at Katharinenburg are very similar to those at Kew and Pawlowsk, but the winter value is much less, owing to the low values in December and January.

In H the mean b for the year is close to the Kew value, but the winter values of b and b/a are distinctly lower than at Kew and Pawlowsk.

In V, Katharinenburg occupies an intermediate position between the "all" and the "quiet" day results for Pawlowsk The mean value of b for the year in Table XII. is little over half the corresponding "all" day value at Pawlowsk, but it is more than thrice the "quiet" day value at Pawlowsk, and double that at Kew.

The winter values of b and b/a at Katharinenburg are exceptionally large, notwithstanding a marked depression in December and January.

TABLE XII.—Katharinenburg (Units 1′ for D and I, 1γ for H and V).

Ranges from Mean Monthly Diurnal Inequalities.

	Declination.			Horizontal force.			Vertical force.			Inclination.		
	a.	$b \times 10^4$.	$10^4 \times b/a$.	a.	$10^3 \times b$.	$10^4 \times b/a$.	a.	$10^3 \times b$.	$10^4 \times b/a$.	a.	$10^4 \times b$.	$10^4 \times b/a$.
January .	3·09	61	20	7·0	91	130	6·1	95	156	0·55	61	112
February .	3·07	293	95	9·8	115	117	4·8	249	514	0·69	60	88
March .	5·48	605	110	20·6	231	112	9·5	224	235	1·21	138	114
April .	9·18	483	53	24·5	308	126	15·8	121	76	1·32	184	143
May .	9·62	509	53	32·0	185	58	16·5	121	73	1·77	111	63
June .	9·11	545	60	27·6	264	95	11·8	159	135	1·54	144	94
July .	9·12	438	48	26·1	296	113	9·9	235	238	1·39	177	128
August .	9·04	310	34	27·5	197	72	11·5	102	89	1·56	114	73
September	6·54	351	54	23·7	201	85	7·8	137	175	1·41	130	92
October .	4·33	305	71	16·7	246	147	5·9	169	285	1·02	164	161
November	2·85	251	88	6·9	164	239	4·9	169	345	0·48	112	232
December.	2·68	114	42	7·7	38	50	5·4	96	177	0·54	38	71
Winter .	2·92	180	61	7·86	102	130	5·32	152	286	0·565	68	120
Equinox .	6·38	436	68	21·38	246	115	9·77	163	167	1·239	154	124
Summer .	9·22	451	49	28·30	235	83	12·44	154	124	1·563	137	87
Year .	6·18	355	58	19·18	195	101	9·17	156	170	1·122	120	106

In I, both a and b are distinctly smaller at Katharinenburg than at Pawlowsk; in summer and the equinox they are very similar to the corresponding values at Kew. The winter value of b at Katharinenburg is decidedly less than at Kew, there being specially low values in December, January, and February. The mean value of b/a for the year is very close to the corresponding values at Kew and Pawlowsk.

§ 21. Table XIII. gives results for the mean of the absolute diurnal ranges for individual months, with corresponding seasonal and yearly values. The last mentioned correspond nearly to the Pawlowsk data in the first line of Table VII. (see § 22 for nature of difference).

In D the values of a in Table XIII., whilst invariably larger than the corresponding values in Table XII., are not very conspicuously so, except in winter. The values of b, however, in Table XIII., are conspicuously larger than those in Table XII., the mean values for the year being roughly one double the other. The difference between the values of b/a in the two tables, though less prominent, is unmistakable.

TABLE XIII.—Katharinenburg (Units 1′ in D, 1γ in H and V).

Monthly Means of Absolute Daily Ranges.

	Declination.			Horizontal force.			Vertical force.		
	a.	$10^4 \times b$.	$10^4 \times b/a$.	a.	$10^3 \times b$.	$10^4 \times b/a$.	a.	$10^3 \times b$.	$10^4 \times b/a$.
January . .	6·34	247	39	25·2	200	79	11·9	139	116
February . .	5·62	920	164	21·7	502	231	10·2	384	377
March . . .	8·44	974	115	31·7	468	148	15·6	383	245
April . . .	10·38	604	58	35·4	392	111	20·7	225	109
May	10·97	615	56	45·7	242	53	22·8	159	70
June . . .	10·00	666	67	36·1	397	110	17·9	215	120
July	9·61	706	73	32·6	538	165	15·0	324	215
August . . .	9·92	503	51	37·9	304	80	16·9	203	120
September . .	7·61	803	105	32·8	365	111	15·3	219	143
October . . .	6·68	661	99	28·9	365	126	11·4	255	223
November . .	4·67	910	195	18·7	440	236	8·6	313	365
December . .	5·15	427	83	21·5	194	90	10·1	155	152
Winter . . .	5·44	626	115	21·76	333	193	10·20	248	242
Equinox . .	8·28	761	92	32·21	398	123	15·76	270	172
Summer. . .	10·13	623	61	38·08	370	97	18·15	225	124
Year. . . .	7·95	670	84	30·68	367	120	14·70	248	168

In H the values of b in Table XIII. are on the average about double those in Table XII., but owing to the large values of a in Table XIII. the excess in its values for b/a is not striking, except in winter.

In V the values of a and b are again much larger in Table XIII. than in Table XII., but the seasonal and yearly values of b/a in the two are closely similar. In Table XIII. the December and January values of b/a are conspicuously low in all the elements as compared to the values for November and February.

§ 22. Table XIV. gives results for the range from the mean diurnal inequality for the year (corresponding to the Pawlowsk data in Table VI.), for the mean of the absolute daily ranges for the year (corresponding to the first line of Table VII.), for the mean of the 12 monthly ranges, and for the yearly range. The results for the second of these quantities, though practically accordant with those in the last line of Table XIII., are not absolutely identical. The figures in Table XIII. represent arithmetic means of a and b resulting from applications of formula (1) to individual months of the year. Table XIV. assumes the 12 monthly mean ranges for each year to be meaned, and these means dealt with by a single application of formula (1). The last two quantities dealt with in Table XIV. do not in reality accord very closely with the linear formula (1), but the figures at all events supply, as in the corre-

sponding case at Pawlowsk, a rough measure of the amplitude of the fluctuation throughout a sun-spot period.

In all the elements included in Table XIV., as we pass from the range of the diurnal inequality to the mean absolute daily range, and thence to the mean monthly range—quantities increasingly influenced by magnetic storms—we see that whilst a increases, b increases in a greater ratio, so that b/a notably rises.

The fall of b/a as we pass from the mean monthly to the annual ranges in D and V may not improbably possess no real significance, but a similar phenomenon, it should be remembered, presented itself in the corresponding Pawlowsk results in Table VII.

TABLE XIV.—Katharinenburg (Units 1′ in D and I, 1γ in H and V).

	Declination.			Horizontal Force.			Vertical Force.			Inclination.		
	a.	$10^4 b$.	$10^4\, b/a$.	a.	$10^3 \times b$.	$10^4 \times b/a$.	a.	$10^3 \times b$.	$10^4 \times b/a$.	a.	$10^4 \times b$.	$10^4 \times b/a$.
Mean diurnal inequality for the year	5·29	342	65	16·8	182	109	8·6	117	137	0·93	105	113
Mean of absolute daily ranges for the year . . .	8·00	652	82	30·7	366	119	14·6	248	171	—	—	—
Mean of absolute monthly ranges for the year . .	18·56	2552	137	76·3	1680	220	46·3	1770	382	—	—	—
Absolute yearly range	41·85	4750	113	146·3	4590	314	178·9	3600	201	—	—	—

§ 23. Table XV. shows the excess of observed over calculated values at Katharinenburg; it answers to Table VIII. for Pawlowsk.

The results for the diurnal inequalities in D, H, and I in Table XV. are similar to the corresponding "all" day results in Table VIII., but on the whole show a slightly less close agreement between theory and observation. In V, however, the agreement is distinctly better at Katharinenburg than at Pawlowsk.

In the case of the absolute daily range the agreement between observed and calculated values is particularly good in D, and it is closer in all the elements than at Pawlowsk. This may be ascribed to the fact that magnetic disturbances are larger at Pawlowsk than at Katharinenburg.

The difference between the observed and calculated values in the monthly range is somewhat large, and there is now clear indication that sun-spot frequency is not by itself a sufficient guide. The observed values in 1893 are conspicuously below, and those in 1892 and 1894 conspicuously above, the calculated. The deficiency in the observed values in 1895 and the excess in 1898 are also marked. Even in the absolute daily range in Table XV. there is a distinct depression in the observed values in 1893 and corresponding enhancement in 1892, though not to the same extent as in the corresponding case at Pawlowsk (see Table VIII.).

TABLE XV.—Katharinenburg (Units 1′ in D and I, 1γ in H and V).

Observed less Calculated Values.

Year.	Ranges from mean diurnal inequalities for the year.				Mean of absolute daily ranges.			Mean of 12 monthly ranges.		
	D.	H.	V.	I.	D.	H.	V.	D.	H.	V.
1890	+0·30	0	0	+0·04	+ 0·03	0	0	− 2·4	− 7	− 11
1891	+ ·35	+ 2	+ 1	+ ·07	+ ·45	+ 3	+ 2	− 1·3	− 9	− 6
1892	− ·04	+ 2	+ 2	+ ·02	+ ·62	+ 6	+ 4	+ 6·5	+ 54	+ 56
1893	+ ·64	− 1	− 2	− ·03	− ·94	− 8	− 8	− 10·2	− 69	− 90
1894	− ·15	− 1	− 1	− ·03	− ·07	0	+ 1	+ 7·0	+ 54	+ 94
1895	− ·18	0	− 1	+ ·03	− ·19	− 1	− 1	− 6·7	− 44	− 60
1896	− ·21	+ 1	+ 2	+ ·01	+ ·39	+ 2	+ 2	+ 0·2	− 3	− 18
1897	− ·17	− 1	0	− ·05	− ·03	0	+ 1	+ 1·9	+ 3	− 6
1898	− ·44	− 1	− 1	− ·02	+ ·23	+ 1	+ 2	+ 5·0	+ 18	+ 28
1899	− ·37	+ 1	+ 1	+ ·06	+ ·04	+ 2	0	− 0·1	+ 11	+ 15
1900	+ ·27	− 1	− 2	− ·10	− ·51	− 4	− 3	− 0·1	− 8	− 3
Mean difference calculated ~ observed	0·28	1·0	1·2	0·042	0·32	2·4	2·2	3·8	26	35
Probable error	0·23	0·8	1·0	0·035	0·30	2·5	2·2	3·5	25	34
Mean value of element	6·71	24·4	13·5	1·373	10·72	46	25	29·2	146	120
Range of element	3·50	15	11	0·87	5·27	33	23	27·5	180	230
Mean difference × 100 / mean value	4	4	9	3	3	5	9	13	18	29
Probable error × 100 / range of element	7	5	9	4	6	8	10	13	14	15

§ 24. Table XVI. supplies disturbance data at Katharinenburg, corresponding to those given in Table IX. for Pawlowsk. If we compare the 11-year means in the two tables we see convincing proof of the remark already made that Pawlowsk is more disturbed than Katharinenburg, the mean ranges in Table IX. being roughly double those in Table XVI.

The small bracketed figures in Table XVI. have the same significance as those in Table IX.

According to the mean monthly range—probably a better criterion than the annual range—1893 would seem to have been relatively less quiet at Katharinenburg than at Pawlowsk, but it stands much below 1892 and 1894. Whilst, however, all the Pawlowsk data made 1892 more disturbed than 1894, the monthly ranges at Katharinenburg give the first position to 1894. In all the columns 1890 appears as the least disturbed year. The monthly ranges—though not the annual ranges—assign to 1900 and 1899 the two next lowest places, the same positions as they occupy according to sun-spot frequency. But, as at Pawlowsk, 1895 is less disturbed, and 1898 much more disturbed than they should be if sun-spot frequency were the sole criterion.

TABLE XVI.—Katharinenburg (Units 1′ in D, 1γ in H and V).

Year.	Mean monthly range.			Annual range.		
	D.	H.	V.	D.	H.	V.
1890 . . .	18·0 (11)	82 (11)	48 (11)	29·3 (11)	163 (11)	117 (11)
1891 . . .	26·4 (8)	127 (7)	101 (6)	47·1 (8)	205 (10)	257 (5)
1892 . . .	43·8 (2)	253 (2)	232 (2)	116·9 (1)	837 (1)	591 (2)
1893 . . .	30·0 (4)	150 (3)	106 (4)	45·5 (3)	296 (5)	172 (10)
1894 . . .	45·5 (1)	261 (1)	278 (1)	90·0 (2)	674 (2)	849 (1)
1895 . . .	28·2 (6)	140 (5)	100 (7)	47·4 (7)	205 (9)	184 (9)
1896 . . .	29·4 (5)	143 (4)	102 (5)	48·6 (6)	320 (4)	244 (6)
1897 . . .	27·2 (7)	124 (8)	87 (8)	67·1 (4)	233 (7)	210 (7)
1898 . . .	30·4 (3)	139 (6)	122 (3)	83·8 (3)	338 (3)	471 (3)
1899 . . .	21·6 (9)	108 (9)	83 (9)	40·8 (10)	208 (8)	333 (4)
1900 . . .	20·9 (10)	84 (10)	60 (10)	61·6 (5)	237 (6)	191 (8)
Means . .	29·2	146	120	61·6	338	329

Batavia (6° 11′ S. lat., 106° 49′ E. long.).

§ 25. Prior to the introduction of electric tramways in 1899 the magnetic results at Batavia Observatory were treated with great completeness in the annual Batavia 'Magnetical and Meteorological Observations.'

Up to the end of 1900 the D and H results seem to have suffered comparatively little, but the V results even then were too disturbed for publication.

The Batavia magnetic records go back to 1882, but are incomplete until 1884. Inspection of the vertical-force data for 1884 and 1885 created some misgivings, which gathered force from an editorial statement that the scale value in that element was at first very variable and remained so until a new magnet was introduced.

After considering all the circumstances, I decided to confine myself to the results for the 12 years 1887 to 1898, coming down to the latest time at which all the elements were free from electric-tram effects. This period has the advantage of supplying a sun-spot minimum group of years 1887 to 1890 equal in length to the sun-spot maximum group 1892 to 1895.

The Batavia tables give not merely the hourly values, but also the sum of the 24 differences from the mean, in the monthly diurnal inequalities.

In (A) I found the sum of the 24 differences in D and H to show the sun-spot connection even more prominently than the ranges. Accordingly I decided to use the sum of the 24 differences at Batavia, in preference to the ranges, when dealing with the diurnal inequalities for the individual months, and to employ the sum of the 24 differences as well as the ranges when dealing with the mean diurnal inequalities for the year.

§ 26. Before giving the results, I would draw attention to a feature wherein Batavia

differs widely from European stations. At Kew, for instance, D, H, V, and I all show a large variation in the amplitude of the diurnal inequality throughout the year. The range is three or four times as large at midsummer as at midwinter, and the way in which the range, or the sum of the 24 differences, varies throughout the year is pretty similar for all the elements. Thus, assuming that the mean diurnal inequality for the year were derivable from a potential, one could obtain a fair first approximation to the mean diurnal inequalities for individual months by multiplying this potential by appropriate numerical factors.

How exceedingly far this is from being the case at Batavia will be seen on inspection of Table XVII. This gives the sum of the 24 differences in the diurnal inequalities for each month of the year, with their mean, and the sum of the 24 differences in the mean diurnal inequality for the year. Batavia being in the Southern hemisphere, May to August are the "winter" months.

The D data in Table XVII. proceed, on the whole, like European data. In V, too, the lowest value occurs in the winter months, but there is likewise a low value in December. While the average value for I from the four winter months is below the mean for the year, the lowest values of all occur in November and December. In H, three out of the four winter months show values above the average, while the four summer months are all below the average. Thus no two elements behave alike, and the phenomena exhibited by H are more nearly opposite than parallel to those observed in high latitudes.

TABLE XVII.—Batavia, 1887–1898 (Unit 1′ in D and I, 1γ in H and V).

Sum of the 24 Hourly Differences in the Mean Diurnal Inequality for the Month.

	Declination.	Horizontal force.	Vertical force.	Inclination.
January	22·04	313·8	276·7	31·77
February	22·55	310·4	289·7	32·36
March	16·87	357·0	282·1	33·72
April	11·96	373·0	231·3	30·87
May	12·34	346·3	189·5	26·85
June	10·26	322·5	189·8	26·02
July	12·14	347·1	202·6	27·84
August	15·25	373·7	187·4	27·87
September	18·56	396·2	214·7	30·08
October	20·57	348·5	249·8	30·51
November	22·06	281·9	215·8	25·82
December	22·01	263·4	196·7	23·82
Arithmetic mean from 12 months	17·22	336·2	227·2	28·96
From mean diurnal inequality for the year	13·73	334·5	216·6	28·36

§ 27. The results pointed out in the last paragraph help to explain some novel features in Table XVIII., which gives the values obtained for a, b and b/a by applying the method of groups to the sums of the 24 differences in the diurnal inequalities for the several months. As in similar tables, the seasonal and yearly values of a and b represent arithmetic means for the included months.

In D and V the lowest values of a are found in winter, but in H and I the lowest values occur in November and December, that is, at midsummer.

In D and V, again, b is distinctly below the average in winter, though not nearly to the same extent as in Europe, and the winter value for I is less than the summer value; but in H the winter value exceeds the summer.

In D, b/a is distinctly smaller in summer than in the other seasons; but in I, H and V the summer value is a trifle the highest. The winter and equinoctial values of b/a are almost identical in all the elements. As compared to northern stations, the variation in b/a throughout the year is exceedingly small.

TABLE XVIII.—Batavia. Sum of 24 Hourly Differences, 1887-98 (Units 1′ in D and I, 1γ in H and V).

	Declination.			Inclination.			Horizontal force.			Vertical force.		
	a.	$10^3 \times b$.	$10^4 \times b/a$.	a.	$10^3 \times b$.	$10^4 \times b/a$.	a.	$10^2 \times b$.	$10^4 \times b/a$.	a.	$10^2 \times b$.	$10^4 \times b/a$.
January .	18·09	109	60	25·37	178	70	244·7	192	78	225·4	142	63
February	19·11	87	45	25·70	168	66	232·4	197	85	238·8	128	54
March .	13·52	105	78	26·65	222	83	266·8	283	106	232·6	155	67
April . .	9·94	55	55	25·74	139	54	309·6	171	55	196·0	96	49
May . .	9·60	68	71	20·00	171	85	264·2	204	77	143·0	116	81
June . .	8·62	40	46	19·87	149	75	241·1	197	82	151·5	92	61
July . .	9·24	69	74	22·29	131	59	259·2	208	80	174·8	66	38
August .	12·16	69	57	22·27	125	56	281·3	207	74	156·4	69	44
September	14·04	108	77	22·51	181	80	303·9	221	73	161·4	127	79
October .	17·87	73	41	24·73	156	63	265·7	224	84	215·6	93	43
November	19·52	78	40	19·20	203	106	212·3	214	101	165·7	154	93
December	18·32	95	52	19·12	121	63	207·5	144	70	163·2	86	53
Winter .	9·90	61	62	21·11	144	68	261·5	204	78	156·4	86	55
Equinox .	13·84	85	61	24·91	174	70	286·5	225	78	201·4	118	58
Summer .	18·76	92	49	22·35	167	75	224·2	187	83	198·3	128	64
Year . .	14·17	80	56	22·79	162	71	257·4	205	80	185·4	110	60

§ 28. In applying the method of groups, it is evidently desirable that one group of years should fall near the middle of the period dealt with, and that part of the second group should precede, and part follow it. This arrangement helps to eliminate any long-period variation, or any gradual change in the conditions. The period 1887 to 1898 being by no means ideal in the above respect, in dealing with the diurnal

inequality for the year, I have employed both the method of least squares and the method of groups. If large differences had presented themselves between the results from the two methods, it would have become necessary to reconsider Table XVIII. As the question of the reliance to be placed on the method of groups is important, I give the results from both methods in Table XIX. The agreement, it will be seen, is least good in D, but it will, I think, be allowed that even there it leaves little to be desired.

TABLE XIX.—Batavia (Units 1′ in D and I, 1γ in Forces).

Mean Diurnal Inequalities for the Year.

		Declination.		Inclination.		Horizontal force.		Vertical force.		Total force.	
		Groups.	Least squares.	Groups.	Least squares.	Groups.	Least squares.	Groups.	Least squares.	Groups.	Least squares.
Ranges.	a	2·455	2·470	3·61	3·60	38·74	38·74	30·13	30·11	20·94	20·90
	$10^4 \times b$	183	179	215	218	2738	2739	1550	1559	1541	1552
	$10^5 \times b/a$	746	725	597	605	707	707	514	518	736	743
Sum of 24 differences	a	10·30	10·34	22·21	22·19	258·5	258·0	173·3	173·1	145·9	145·4
	$10^3 \times b$	88·8	87·6	159·1	159·8	1967	1980	1121	1127	1190	1204
	$10^5 \times b/a$	862	847	716	720	761	767	647	651	816	828

§ 29. In the case of I, H and V the values of a, b and b/a given in Table XIX. for the sum of the 24 differences in the mean diurnal inequality for the year do not differ much from the yearly mean in Table XVIII. In the case of D, however, the results in the two tables are widely different, the a in Table XVIII. being nearly 40 per cent. in excess of that in Table XIX. The closeness of the values of a in the two tables in I, H and V, and their divergence in the case of D, is what we might anticipate from the figures for the sums of the 24 differences in the last two lines of Table XVII. The real inference to be drawn is that in D the hours of maximum and minimum vary somewhat widely from month to month, though apparently to a smaller extent in years of sun-spot maximum than in years of sun-spot minimum.

The data in Table XIX. for Batavia correspond exactly to those given for Kew in (A), Table XLIV.

In D the Batavia value of b for the 24 differences is almost exactly the third of the Kew value; in the case of the ranges the Batavia value is relatively larger, but still less than half that at Kew, Greenwich or Pawlowsk.

The D values of b/a, however, at Batavia and Kew are nearly equal.

In I the Batavia value of b is 70 per cent. larger than the Kew in the case of the ranges, and almost exactly double in the case of the 24 differences. The Batavia

values of a, however, so much exceed the Kew that b/a is more than twice as big at Kew as it is at Batavia.

In H the Batavia values of b are both roughly 50 per cent. in excess of the Kew, but the Kew values of b/a are more than 50 per cent. in excess of those at Batavia.

In V the values of b are again very much larger at Batavia than at Kew; in the 24 differences the Batavia value of b/a is somewhat the higher, but in the ranges it is slightly the lower.

§ 30. The relation between the values found for b/a is probably the best measure of the relative importance of the sun-spot connection in any two cases. Applying this criterion to the 24 differences and range results obtained by least squares in Tables XIX., we obtain the following values for the ratio of

(b/a) from sum of 24 differences : (b/a) from ranges :—

Declination.	Inclination.	Horizontal force.	Vertical force.	Total force.
1·168	1·191	1·085	1·257	1·115

The mean of the first four of these ratios is 1·18 and the corresponding figure for Kew (as deducible from (A), Table XLIV.) is 1·19. Thus the greater variability of the sum of the 24 differences with sun-spot frequency observed at Kew is also seen at Batavia, and to approximately the same extent.

§ 31. The Batavia publications record the values of the constants in the 24-hour and 12-hour terms of the Fourier series

$$c_1 \sin(t + \alpha_1) + c_2 \sin(2t + \alpha_2) +$$

for the mean diurnal inequality for the year. Here c_1, c_2 replace the Batavia notation A_1, A_2.

Table XX. gives the values which I have found for a, b and b/a in this case from the method of groups. The results should be compared with those given for Kew and Wilhelmshaven in (A), Table XLII., though the slight difference in the method of obtaining the Kew results should be noted.

In I, H and V the values of b/a in Table XX. are nearly alike in c_1 and c_2, and they approach fairly closely to the corresponding values in Table XIX. applicable to the ranges of the mean diurnal inequalities. In declination and total force, however, the values of b/a in Table XX. are decidedly higher for c_1 than for c_2. This phenomenon was observed at both Kew and Wilhelmshaven in the case of the declination and the westerly component.

TABLE XX.—Batavia, 1887–98 (Units 1′ for Angles, 1γ for Forces).

Amplitudes of 24-hour and 12-hour Terms in Fourier Series for Mean Diurnal Inequality for the Year.

	Declination.		Inclination.		Horizontal force.		Vertical force.		Total force.	
	c_1.	c_2.	c_1.	c_2.	c_1.	c_2.	c_1.	c_2.	c_1.	c_2.
Mean value of amplitude (for 12 years) . .	0·748	0·778	1·793	0·837	20·89	9·07	13·62	7·27	11·71	5·45
a	0·548	0·614	1·427	·663	16·13	7·13	11·14	5·90	8·84	4·43
$10^4 \times b$ . . .	52	42	95	45	1233	502	641	353	744	263
$10^4 \times b/a$ . . .	94	69	66	68	76	70	58	60	84	60

§ 32. Disturbances have special attention paid them at Batavia. Following a practice, of which SABINE was an advocate, a reading at Batavia is regarded as disturbed when its difference from the mean reading at that hour during the month reaches or exceeds a certain limit. The limiting values adopted at Batavia are 1′·3 in D and 11γ in H and V.

The arbitrary nature of such criteria, and the difficulty of justifying one limiting value in preference to another, have been more than once pointed out. It is arguable that the limit should vary with the season of the year, and even with the sun-spot frequency. In a European station, for instance, the range of the regular diurnal inequality near sun-spot maximum at midsummer is very large compared to that near sun-spot minimum at midwinter, and a good deal might be said for a limiting value which bore a fixed ratio to the range from the mean diurnal inequality for the month.

The disturbed values which exceed the hourly mean, and those which fall below it, are termed respectively "positive" and "negative" disturbances; they are in the first instance treated separately at Batavia, tables being given of the sum of the values of the disturbances and of their number. A final summary gives the aggregates of the positive and negative totals treated numerically. Table XXI. gives these aggregate values and numbers as published in the annual Batavia 'Observations.'

The number of disturbances in D is less than half that in V, and little over a quarter that in H. We cannot, however, draw any safe inference as to one element being absolutely more or less disturbed than another. If we calculate the ratios borne by the disturbance limits accepted at Batavia to the mean ranges of the diurnal inequalities for the year in the respective elements, for the period 1887 to 1898, we find the following results:—

	D.	H.	V.
$\frac{\text{Disturbance limit}}{\text{range}}$ =	0·41	0·22	0·30

If instead of the ranges from the mean diurnal inequality for the year we had taken the arithmetic mean of the 12 monthly inequality ranges, we should have obtained a somewhat smaller fraction in the case of D. But the figures are at least suggestive that the explanation of the great difference in the number of disturbances in D, H, and V may be largely due to the disturbance limit being less exacting in one element than another.

TABLE XXI.—(Units for "Values" 1′ in D, 1γ in H and V.)

Aggregate Values and Numbers of Disturbances at Batavia.

Year.	Declination.		Horizontal force.		Vertical force.	
	Values.	Numbers.	Values.	Numbers.	Values.	Numbers.
1887	339·3	210	17,160	1023	9,612	671
1888	237·3	149	16,339	933	12,709	807
1889	237·5	153	11,686	700	11,581	783
1890	354·0	252	6,227	346	4,781	301
1891	425·4	262	22,605	1208	16,394	1016
1892	1020·8	571	40,582	1786	20,295	1095
1893	730·8	427	23,731	1286	11,021	715
1894	840·2	462	37,239	1666	13,418	751
1895	616·0	360	23,595	1380	11,441	757
1896	458·2	286	19,983	1139	5,790	409
1897	464·5	286	14,187	815	5,995	408
1898	434·2	262	18,605	1030	8,485	548
Means	513·2	307	20,995	1109	10,960	688

§ 33. On examining Table XXI. it will be seen that the number and aggregate value, though generally increasing or decreasing together, are far from being in a constant ratio in any of the elements. As to which is the better measure of disturbance, opinions may well differ; but the aggregate values constitute probably the nearest parallel to the Pawlowsk and Katharinenburg data in Tables IX. and XVI.

According to both numbers and aggregate values, 1893 was less disturbed than 1892 or 1894, but its relative quietness is not so conspicuous, especially in D and V, as it was at Pawlowsk or even Katharinenburg.

Table XXI. must, of course, receive contributions—at least, in the case of H

and V—from a number of days which are not days of large disturbance; but if this were the true explanation, we should expect the position of 1893 at Batavia and Pawlowsk to differ more in the case of H than in that of D, which is the reverse of what happens.

§ 34. Table XXII. gives values of a, b and b/a calculated for the data in Table XXI. The value of b/a answering to the "aggregate value" is in each case greater than that answering to the "number"; and, except in the case of V, both values of b/a are considerably higher than the corresponding yearly values in Tables XVIII. and XIX.

If we compare Table XXII. with Table XIV. for Katharinenburg, we see that in V the Batavia disturbance values of b/a are much less than the lowest value of b/a at Katharinenburg, viz., that for the diurnal inequality. In H the Batavia disturbance values of b/a are similar to the value of b/a in the absolutely monthly range at Katharinenburg. In D, however, the Batavia disturbance values of b/a are much in excess of any corresponding value at Katharinenburg.

The way in which disturbance influences the records at the two places are thus widely different.

TABLE XXII.—Batavia "Disturbances," 1887–98 (Units for "Values" 1′ for D, 1γ for H and V).

	Declination.		Horizontal force.		Vertical force.	
	Aggregate values.	Numbers.	Aggregate values.	Numbers.	Aggregate values.	Numbers.
a	217·7	153·7	10,312	657·9	8425	578·9
b	7·65	3·96	277	11·7	65·6	2·84
$10^4 \times b/a$ . .	351	258	268	178	78	49

§ 35. Table XXIII. compares observed and calculated values in the mean diurnal inequality for the year at Batavia, and in the aggregate value of the disturbances. The values employed for a and b in the case of the ranges are those calculated by least squares.

The nicety of agreement in the case of the ranges is very similar to what has been already observed at Kew, Pawlowsk and Katharinenburg; and, as at Kew, the agreement is practically the same for the 24 differences as for the ranges. As has been generally observed elsewhere, the agreement is least good in the case of V.

In the case of the aggregate value of the disturbances, the agreement is pretty similar to what was found for the mean of the absolute monthly ranges at Katharinenburg; and, as elsewhere, the failure of the formula to account satis-

factorily for the phenomena observed in 1892 and 1893 is conspicuous. Unlike Pawlowsk and Katharinenburg, Batavia shows, however, no abnormal excess of disturbances in 1898.

TABLE XXIII.—Batavia (Units 1′ for D, 1γ for H and V).

Observed less Calculated Values.

Year.	Mean diurnal inequality for the year.						Aggregate values of disturbances.		
	Ranges.			24 differences.					
	D.	H.	V.	D.	H.	V.	D.	H.	V.
1887	−0·25	+ 0·5	− 2·7	− 0·77	+ 2·2	− 18·6	+ 21·4	+ 3,235	+ 327
1888	− ·07	+ 0·9	+ 0·9	− ·28	+ 5·0	+ 0·2	− 32·4	+ 4,146	+ 3,838
1889	+ ·16	− 0·3	+ 3·0	+ ·36	− 1·1	+ 13·7	− 28·4	− 368	+ 2,743
1890	+ ·09	+ 0·4	+ 1·3	+ ·21	+ 8·4	+ 18·0	+ 82·0	− 6,049	− 4,110
1891	− ·22	+ 2·4	+ 5·3	− ·88	+ 15·2	+ 36·9	− 64·6	+ 2,448	+ 5,633
1892	+ ·16	+ 0·6	+ 2·8	+ ·40	+ 12·3	+ 17·9	+244·6	+10,082	+ 7,080
1893	− ·02	+ 1·1	+ 0·6	·00	+ 8·9	+ 3·9	−136·4	−10,061	− 2,975
1894	− ·04	− 1·6	− 1·8	− ·03	− 9·8	− 9·3	+ 25·7	+ 5,355	− 125
1895	− ·08	+ 1·4	+ 0·6	− ·53	− 0·3	− 0·7	− 91·4	− 4,418	− 1,184
1896	+ ·03	− 3·8	− 5·1	+ ·41	− 29·1	− 34·2	− 79·3	− 1,890	− 5,378
1897	+ ·19	− 0·6	− 3·4	+ ·66	− 6·3	− 23·0	+ 46·3	− 3,371	− 4,149
1898	+ ·04	− 1·0	− 1·6	+ ·44	− 5·5	− 5·1	+ 12·2	+ 909	− 1,692
Mean difference calculated ∽ observed	0·112	1·22	2·42	0·414	8·7	15·1	72·1	4,361	3,270
Probable error	0·096	1·09	2·02	0·344	8·1	13·4	61·2	3,734	2,730
Mean value of element	3·16	49·3	36·1	13·73	334·5	216·6	513	20,995	10,960
Range of element	1·52	22·9	14·9	7·12	165·6	104·0	783	34,355	15,514
Mean difference × 100 / mean value	4	2	7	3	3	7	14	21	30
Probable error × 100 / range of element	6	5	14	5	5	13	8	11	18

Mauritius (Lat. 20° 6′ S., Long. 57° 33′ E.).

§ 36. Owing to the novelty in some of the features of the Batavia results, examination of the data from a second tropical station seemed desirable. I have accordingly made use of a number of tables of magnetic results* at Mauritius, published in a convenient form in 1899. In D, data are given for the period 1875 to 1890, in H for 1883 to 1890, and in V for 1884 to 1890. The shortness of the two latter periods, and the fact that the data are not contemporaneous with those for most of the other stations, are drawbacks, but there is small choice of magnetic data in low latitudes.

* 'Mauritius Magnetical Reductions,' edited by T. F. CLAXTON, F.R.A.S., Director Royal Alfred Observatory, Mauritius, 1899.

On examining the tables, I found that the mean D ranges in 1881 and 1882—years of fairly large sun-spot frequency—showed a remarkable depression, being only about half those in 1880 and 1883, and in the preface I found the following editorial reference to some readjustment of the declination magnetograph in December, 1882: "In the latter part of the year 1882 the effect of torsion on the magnetograph is very pronounced." As the phenomenal smallness of the range seems to have ceased with the readjustment, and as the Milan and Greenwich records show no parallel to the reduction of the ranges in 1881 and 1882, I have omitted these years entirely from the calculations.

The Mauritius publication gives in special detail the mean value for each month and year of the absolute daily ranges. These ranges seem based entirely on hourly readings, and so are not absolutely equivalent to the Katharinenburg ranges dealt with in Table XIII.

As the variation in these daily ranges throughout the year has exceptional features, I give particulars in Table XXIV. There is a resemblance to phenomena at Batavia. In D the variation in the range, though much less conspicuous than in Northern Europe, is well marked; the values for the three midwinter months—May, June, and July—are well below the average. In H the variation is small, and somewhat irregular; on the whole, the range is smallest in winter, from May to August, but the next lowest values appear in February and December.

There is a distinct reduction in the V range near midwinter, but a very similar reduction occurs at midsummer.

TABLE XXIV.—Mauritius (Units 1′ for D, 1γ for H and V).

Monthly Means of Absolute Daily Ranges.

	Declination, 1875–80 and 1883–90.	Horizontal force, 1883 to 1890.	Vertical force, 1884 to 1890.
January	6·93	37·9	17·1
February	7·79	35·0	19·5
March	7·11	36·2	20·1
April	5·75	37·6	17·3
May	4·87	35·0	16·5
June	4·03	34·1	15·5
July	4·36	33·8	17·1
August	6·00	34·5	22·0
September	6·28	36·6	22·7
October	6·71	37·4	19·4
November	6·99	37·8	16·7
December	6·78	35·3	15·2
Mean	6·13	35·9	18·2

§ 37. Table XXV. gives the values of a, b, and b/a applicable to the monthly means of the absolute daily ranges at Mauritius. The method of groups was employed, the groups being as follows:—

Years of sun-spot.	For D.	For H.	For V.
Maximum	1880, 1883, 1884, 1885, 1886	1883 to 1886	1884 to 1886
Minimum.	1878, 1879, 1888, 1889, 1890	1887 „ 1890	1887 „ 1890

The seasonal and yearly values of a and b are arithmetic means from the included months, and these means are employed in calculating b/a.

The values of b in Table XXV. fluctuate somewhat erratically from month to month even for D, where 14 years' data are utilised. The exceptional features presented by the September and October data in V had better be regarded provisionally as accidental.

In D and V we have b largest in winter and least at the equinox, a very remarkable feature.

Comparing Tables XXV. and XIII., we see that whilst the mean values of a for the year are fairly similar, the values of b and of b/a at Mauritius are roughly only from a half to a third of the corresponding values at Katharinenburg.

TABLE XXV.—Mauritius (Units 1′ for D, 1γ for H and V).

Monthly Means of Absolute Daily Ranges.

	Declination.			Horizontal force.			Vertical force.		
	a.	10^4b.	$10^4b/a$.	a.	10^3b.	$10^4b/a$.	a.	10^3b.	$10^4b/a$.
January . . .	6·02	381	63	35·1	89	26	14·0	110	78
February . . .	7·34	186	25	29·7	164	55	17·8	55	31
March	6·70	158	23	29·7	200	67	16·8	104	62
April	5·06	278	55	33·5	119	35	14·1	115	82
May	4·10	354	86	30·1	165	55	13·7	97	71
June	3·70	130	35	26·9	209	78	13·2	82	62
July	3·65	290	80	28·3	159	56	13·9	113	81
August . . .	5·20	362	69	28·6	214	75	18·1	157	87
September . .	5·93	152	26	30·8	214	69	20·6	9	4
October . . .	6·41	145	23	31·8	221	70	20·2	[− 47]	[− 23]
November . .	6·35	331	52	29·2	376	129	16·2	33	21
December. . .	6·56	120	18	29·7	226	76	13·5	96	71
Winter . . .	4·16	284	68	28·5	187	66	14·7	112	76
Equinox . . .	6·03	183	30	31·5	188	60	17·9	45	25
Summer . . .	6·57	254	39	30·9	214	71	15·4	73	48
Year	5·58	241	43	30·3	196	65	16·0	77	48

§ 38. Table XXVI. deals with the mean of the absolute daily ranges for the year, and with the ranges and the sums of the 24 differences in the mean diurnal inequalities for the year. The grouping of the years is the same as for the previous table. The values of a, b, and b/a for the yearly mean of the absolute daily ranges do not agree quite so closely with the corresponding means of the 12 monthly values in Table XXV. as was the case at Katharinenburg (*cf.* Tables XIII. and XIV.).

In H the values of a and b for the absolute daily range are about double those for the range of the diurnal inequality; in D and V the differences between the two sets of values are smaller, but still considerable. In all three elements the values of b/a for the two species of ranges are fairly similar.

In the case of the mean diurnal inequality in D, the values of b are lower even than those given in Table XIX. for Batavia, and the values of b/a are the lowest we have yet met with. The values of b for the ranges of the mean diurnal inequalities in H and V are much lower than at Batavia, but the values of b/a at the two places are fairly similar.

The values of b/a for the 24 differences do not show that decided excess over the values for the ranges that was seen at Kew and Batavia.

TABLE XXVI.—Mauritius (Units 1′ for D, 1γ for H and V).

	Ranges.						24 differences.		
	Mean of absolute daily values for the year.			From mean diurnal inequality for the year.			From mean diurnal inequality for the year.		
	a.	$b \times 10^4$.	$(b/a) \times 10^4$.	a.	$b \times 10^4$.	$(b/a) \times 10^4$.	a.	$b \times 10^3$.	$(b/a) \times 10^4$.
Declination . .	5·53	255	46	4·06	164	40	15·96	79	49
Horizontal force .	30·4	1859	61	15·0	956	64	116·0	695	60
Vertical force . .	16·2	840	52	11·9	685	58	66·6	292	44

§ 39. Table XXVII. gives the differences between observed and calculated mean yearly data at Mauritius. Comparing the figures in the last line of the table with the corresponding figures in Tables IV., VIII., XV., and XXIII., we conclude that the agreement is not quite so good at Mauritius as at the other stations. The agreement is closest for the mean of the daily declination ranges, where it is very fair; it is on the whole better for V than for H, which is exceptional.

TABLE XXVII.—Mauritius (Units 1′ for D, 1γ for H and V).

Observed Less Calculated Values.

Year.	Mean of absolute daily ranges.			Mean diurnal inequality.					
				Ranges.			24 differences.		
	D.	H.	V.	D.	H.	V.	D.	H.	V.
1875	+0·1	—	—	+0·4	—	—	+ 0·7	—	—
1876	+ ·1	—	—	·0	—	—	+ 0·2	—	—
1877	− ·2	—	—	− ·2	—	—	− 1·8	—	—
1878	+ ·3	—	—	+ ·6	—	—	+ 1·5	—	—
1879	− ·1	—	—	− ·2	—	—	− 0·3	—	—
1880	− ·3	—	—	− ·1	—	—	+ 0·1	—	—
1883	+ ·3	+ 0·3	—	+ ·5	− 0·9	—	+ 0·4	− 2·8	—
1884	+ ·3	− 4·1	+ 0·9	+ ·3	− 3·6	+ 1·1	+ 1·2	− 22·9	+ 6·9
1885	− ·2	− 0·4	− 2·2	+ ·1	+ 1·4	− 1·5	+ 0·7	+ 4·9	− 5·4
1886	− ·2	+ 4·2	+ 1·3	− ·6	+ 3·1	+ 0·5	− 1·4	+ 20·7	− 1·2
1887	− ·2	+ 1·8	− 1·7	− ·6	+ 0·8	− 2·3	− 1·2	+ 9·0	− 6·7
1888	− ·1	+ 2·1	− 0·1	− ·3	+ 1·4	− 0·4	− 0·6	+ 8·5	+ 0·6
1889	− ·1	− 1·4	+ 0·7	+ ·2	− 0·9	+ 1·4	+ 0·8	− 8·0	+ 4·3
1890	+ ·1	− 2·4	+ 1·0	− ·2	− 1·3	+ 1·2	− 0·2	− 9·6	+ 1·9
Mean difference calculated ∽ observed	0·19	2·09	1·13	0·31	1·67	1·20	0·79	10·8	3·9
Probable error	0·14	1·80	·94	0·25	1·41	0·98	0·67	9·2	3·3
Mean value of element	6·11	35·9	18·2	4·44	17·8	13·6	17·8	137	74
Range of element	1·90	13·2	6·8	1·90	7·0	6·8	7·0	46	28
$\frac{\text{Mean difference} \times 100}{\text{mean value}}$	3	6	6	7	9	9	4	8	5
$\frac{\text{Probable error} \times 100}{\text{range of element}}$	7	14	14	13	20	14	10	20	12

Summary.

§ 40. A slight progressive decrease in a and increase in b in the sun-spot formula (1) is suggested by the Greenwich D and H data from 1841 to 1896, but this does not meet with support from Signor RAJNA's analysis of D ranges at Milan from 1836 to 1894. In both cases there is an element of uncertainty, arising from want of homogeneousness in the data.

According to RAJNA's earlier data, values of a, and to a lesser extent values of b, calculated from periods as long as 14 years may differ very sensibly from those calculated from longer periods, but differences of this kind seem to have diminished since observations became more homogeneous and are probably ascribable in part to observational uncertainties.

Results calculated for Milan from the period 1890 to 1900, which is the period chiefly utilised in the present paper, differ but little from those found by RAJNA for the periods 1836 to 1894 and 1871 to 1894.

The tendency for b to be small in winter and large in summer, described at Kew, is also, in general, conspicuous elsewhere; but there are exceptions, especially at tropical stations.

The tendency in b/a to be large in winter as compared to summer, so prominent at Kew, is also, in general, prominent at other northern stations, but the phenomenon is comparatively inconspicuous in the case of the declination range at Greenwich. At the tropical stations the seasonal change in b/a appears much reduced and is somewhat uncertain.

There is no conspicuous difference between the "all" and the "quiet" days' mean yearly values of b and b/a for the ranges of the D and H diurnal inequalities at either Greenwich or Pawlowsk; but at Pawlowsk there is a somewhat notable difference between "all" day and "quiet" day D results in winter, and the difference between "all" and "quiet" day V results is very large throughout the whole year.

If we exclude Mauritius, the values of $10^4 b/a$ for the ranges in the mean diurnal inequality of declination for the year at the several stations vary only from 65 to 73. The corresponding values of b show also a pretty close agreement at the northern stations, but the values for the tropical stations are much smaller.

In H there is no very conspicuous difference in the values of b or b/a for the ranges from the mean diurnal inequality for the year at the northern stations; but the values found for b/a at Batavia and Mauritius are considerably smaller, while the value found for b is smaller at Mauritius, but very materially larger at Batavia.

When the formula (1) is applied to any ordinary measure of magnetic disturbance, it gives much too high values for 1893—the year of sun-spot maximum—and much too low values for 1892. Thus the application of (1) to disturbances has not the same justification as its application to ordinary diurnal inequalities. It may, however, serve a useful purpose in giving a greater degree of definiteness to the comparison of contemporaneous disturbance phenomena at the same or at different stations.

In the case of results obtained by the application of (1) to individual months of the year a considerable latitude must be allowed to chance, especially in winter months when the diurnal range is small, unless an exceptionally long series of observations is available. Results obtained from arranging months in seasons are much less exposed to numerical uncertainties, but they are insufficient for the reason that there are conspicuous differences between months which have to be grouped under the same season. This remark applies more particularly to winter and equinoctial months in higher latitudes.

[*June* 8, 1904.—The following additional data—all obtained by the method of least squares—apply to the ranges of the mean diurnal inequalities for the year at Irkutsk ("all" days) and Colaba ("quiet" days), and to the mean difference between the

absolute daily maximum and minimum at Zi-ka-wei. The units are 1′ for angles, 1γ for force components.

Place . . .	Irkutsk (Siberia).			Zi-ka-wei (China).			Colaba (Bombay).		
Latitude . .	52° 16′ N.			31° 12′ N.			18° 54′ N.		
Longitude . .	104° 16′ E.			121° 26′ E.			72° 49′ E.		
Period of years	1890 to 1900.			1890 to 1900.			1894 to 1901.		
Element . .	a.	10^4b.	$10^4b/a$.	a.	10^4b.	$10^4b/a$.	a.	10^4b.	$10^4b/a$.
D	4·815	358	74	4·369	303	69	2·373	66	28
I	0·971	87	90	—	—	—	—	—	—
H	18·18	1896	104	—	—	—	31·65	2814	89
V	6·49	710	109	—	—	—	19·35	723	37

At Irkutsk the values of b for D and H are similar to those at Katharinenburg; the values of b/a for these elements are similar to those at Kew; in V the values of b and b/a are decidedly less than at Katharinenburg.

At Zi-ka-wei b/a is decidedly less, and b much less, than the corresponding values for Katharinenburg (second line of Table XIV.).

At Colaba the ("quiet" day) values of b and b/a for D are notably less than the corresponding ("all" day) values at Mauritius, the smallest occurring in the paper; but the value of b for H exceeds that at Batavia, the largest previously noted. The value of b/a for V is conspicuously small.]

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